JOURNAL

OF THE

Elisha Mitchell Scientific Society

Volume XXXVIII MAY 1923 Nos. 3 and 4

A KEY TO THE FULGORIDÆ OF EASTERN NORTH AMERICA WITH DESCRIPTIONS OF NEW SPECIES

By Z. P. Metcalf

Introduction

The Family *Fulgoridæ* is perhaps the most neglected family of homopterous insects. This is due in no small measure to the fact that in comparison with other families of the order they are relatively of little economic importance in our region. This is merely relative, however, and in a final summing up it must be borne in mind that a family of relatively small importance when compared with *Coccidæ* or *Aphididæ* may be of outstanding importance when compared with other families in other orders. Much more study must be devoted to this family, however, before we can even begin to estimate its real economic importance.

Taxonomically the Family *Fulgoridæ* is of great interest and perhaps in no family of insects in any modern scheme of classification do we have as many and as diverse forms as in this one. There is no doubt that the *Fulgoridæ* are really of superfamily rank, but the author feels that violent revisions in schemes of classification have no place in a study of a restricted fauna such as this. From the viewpoint of bizarre forms and structures few insect groups can even approximate the members of this family. Unfortunately from the standpoint of great popular interest the forms are too small to create much excitement. But with all of these limitations the chief drawback to a real interest in this group is the fact that there is no manual of the genera and species available. Descriptions are scattered far and wide. A recent census shows that the descriptions of the two hundred and fifty-eight described species in our region are scattered in no less than fifty-nine separate publications with usually no corre-

lation of new species with old or with no keys for their determination and very few illustrations. Then too, many of the original descriptions were made by the older entomologists before the middle of the nineteenth century and have never been brought down to date. It was with these points in mind that the present paper has been prepared in the hope that it would bridge a gap and would stimulate real interest in this family in the future.

DISTRIBUTION

The *Fulgoridæ* of Eastern North America have not been collected sufficiently for us to know very much about their distribution as is evidenced by the fact that of the three hundred and one known species eighty are known from a single state only, or two closely contiguous states. Of the remainder ninety-seven seem to have a general distribution; forty-four are generally southern in their distribution; twenty-nine are western species that invade our territory; ten are apparently West Indian forms more or less abundant in Cuba that have invaded Florida; three are European forms which have become established; and nine are Mexican forms that have crossed the Mexican border into Texas and the other border states.

As used in this paper the term Eastern North America is used to include all the territory lying east of the foot hills of the Rocky Mountains. This large area seems to be rather homogeneous as far as its fulgorid fauna is concerned, but as pointed out above there are naturally certain intrusions especially in Florida and Texas. Other West Indian, Mexican and western forms will undoubtedly be found within our territory but only species with definite records within our borders have been included below. Certain of the older species which have been recorded from North America only have been included for the guidance of future students.

TAXONOMY

HEAD REGIONS. The regions of the head of the *Fulgoridæ* used in taxonomy are the vertex, frons, genæ and clypeus. The frons, vertex and genæ are frequently prolonged into a long cephalic process. The vertex shows a number of good specific characters in most genera. The comparative length and breadth, the shape and the arrangements of the carinæ are usually quite specific and have been much used in the past. Sometimes the vertex is narrow and shades

insensibly into the frons. Sometimes it rounds into the frons but is more distinct. In still other cases it is sharply set off from the frons and may be separated for its entire breadth from the frons by a more or less distinct carinæ (*Issinæ, Megamelanus*) or sulcus (*Poblicia*). The vertex is sometimes prolonged along the dorsal side of the cephalic process (*Dictyophara, Scolops*). Sometimes the vertex is furnished with a more or less distinct median carina and another very common condition is to have two lateral carinæ converging towards the frons (*Cixius,* many *Delphacinæ*). In this condition the vertex is divided into three regions, the two lateral compartments between the lateral carinæ and the converging carinæ, and the central compartment posterior to the converging carinæ. Sometimes the central compartment is divided by a median y-shaped carina into three compartments, the frontal compartment and the posterior compartments.

The frons is usually separated from the genæ by sharp carinæ and from the clypeus by a distinct sulcus. Its separation from the vertex may be distinct and furnished by a carina or sulcus as mentioned above or it may be impossible to distinguish the frons from the vertex, in taxonomy the entire dorsal surface is usually called the vertex although this may include a portion of what is the frons morphologically. The comparative length and breadth of the frons is often a very useful character, as is its comparative width at the base, along the vertex and at the apex, along the clypeus.

The characters of the genæ have not been much used but there are frequently good generic characters present especially in the shape and size of the antennal socket and antennal collar.

The clypeus frequently furnishes reliable characters both in comparative size and shape and in the arrangement of the carinæ. In the subfamilies *Fulgorinæ* and *Dictyopharinæ* and some others the clypeus is laterally sharply carinate but in other groups it is ecarinate laterally. The depth of its insertion into the frons is also a useful character at times. The clypeus frequently shades imperceptibly into the labrum-epipharynx which may or may not be evidently divided into its separate components.

Ocelli are frequently present and usually these consist of a lateral pair placed between the compound eyes and the lateral frontal carinæ. In the *Cixiinæ* there is usually a very distinct frontal ocellus at the apex of the frons. Sometimes this frontal ocellus is represented by a scar only.

APPENDAGES. The following appendages, compound eyes, antennæ and mouth parts especially the labrum-epipharynx and labium are usually conspicuous. The compound eyes are sub-hemispherical in shape and usually crescentric in outline with a ventral sinus for the reception of the antennæ but occasionally, as in *Bothriocera,* the sinus and antennæ are anterior in position.

The antennæ consist of two segments with a terminal flagellum. The comparative lengths of the two segments of the antennæ are frequently useful as is the shape of these segments. The first segment is usually shorter than the second and is frequently set in a distinct socket and more or less surrounded by a collar-like projection of the genæ, the antennal collar. Usually the first segment is more or less terete or frequently it is widened distally and more or less club-shaped. In a few cases the first joint is much flattened (*Bostæra*). The second joint is usually club-shaped, sometimes flattened and more or less studded with sensory organs. The number and arrangement of these sensory organs furnish excellent characters as pointed out by Hansen long ago, but their examination requires a rather high power and for that reason they have not been much used. The flagellum is usually longer than the two segments of the antennæ combined. It consists of an enlarged spherical basilar portion, the basal segment and a distal portion, the bristle. The bristle of the flagellum is gradually attenuated. In *Otiocerus* the antennæ are provided with two or three vermiculate appendages of unknown function.

The mouth parts are of the usual haustellate homopterous type. The epipharynx is small and sharply pointed and lies in the groove of the labium. It is not always distinctly separated from the labrum. The labium is long or short and consists of four segments. The basal and sub-basal segments are closely applied to the gular surface of the head and are not visible from the frontal view. The apical and subapical are usually unequal in length, the apical being short and the subapical long. The length of the labium is frequently a good generic character but is seldom of any value as a specific character.

THORACIC REGIONS. The typical regions of the thorax are somewhat modified in the *Fulgoridæ*. The pro- and mesonotum are conspicuous but the metanotum is hidden by the wings when at rest. The propleura are covered by the lateral extensions of the pronotum, the breast plates, but the meso- and metapleurs are quite distinct. The sternites are small.

The pronotum is a saddle-shaped piece with the breast plates extending ventrad and covering the propleura. The pronotum is long or short sometimes being reduced to a mere collar (*Catonia*) and sometimes longer than the mesonotum. It is usually medianly carinate and more or less notched posteriorly, although it is truncate in most *Issinæ*. There are frequently intermediate and lateral carinæ whose positions and direction have been much used as generic characters among the *Delphacinæ*. The breast plates are usually separated from the dorsal field of the pronotum by distinct carinæ.

The mesonotum is generally longer than the pronotum, broadly triangular and is as a rule provided with three distinct carinæ, sometimes five (*Oliarus*). In all of our genera there are distinct tegulæ at the base of the fore wings. These are broadly crescentric in shape with one horn directed dorsad and the other laterad. The tegulæ are frequently medianly carinate and their shape and size furnish good diagnostic characters.

THORACIC APPENDAGES. The thoracic appendages are the typical three pairs of legs and two pairs of wings although the metathoracic (hind) wings are sometimes wanting (most brachypterous forms). The legs have the usual segments of an insect leg, with well developed trochantines and three jointed tarsi. In the prothoracic (fore) legs the coxæ are generally long sometimes nearly as long as the femora. The femora and tibiæ are terete with the former thick and the latter slender. They are nearly equal in length. Sometimes (*Phylloscelis* and *Phyllodinus*) the femora and tibiæ are much dilated. Spines are usually absent on the fore legs and the pulvillus and claws are weakly developed. The mesothoracic (middle) legs are but little used taxonomically. They are somewhat intermediate in character between the fore and hind legs. In the metathoracic (hind) legs the coxæ are usually nearly globular in shape but sometimes they are more elongate. The femoræ are clavate and not especially elongate. The tibiæ are slender and much elongate. Normally they have one or more heavy spines along the posterior lateral margin, although these spines are sometimes absent (*Myndus, Oecleus*). The number of these spines are not specifically constant as has been assumed by some writers as the number frequently varies on the two members on the same specimen. The number of these tibial spines and their approximate position should be recorded in all generic diagnoses, however, as they are very useful. The hind tibiæ frequently end in a circlet of spines

whose number and arrangement seems to be rather constant. The two basal segments of the hind tarsi are usually provided with well defined spines ventrally on their apical margins. The claws are usually weak and simple but the pulvilli are frequently of considerable size. The members of the subfamily *Delphacinæ* are provided with a special organ, the calcar, which is an organ of great taxonomic importance in this group. It assumes four primary shapes: spiniform, in which it is slender and attenuated to a rather fine point; cultrate, in which it has one edge thick and the other edge thin like a thick bladed knife, the thin edge may or may not be provided with marginal teeth; foliaceous, where the calcar is reduced to a thin leaf-like structure; and lastly tectiform, where the calcar is angled in cross section, in some cases (*Stenocranus*) the two edges of the tectiform calcar are brought close together and the space between is filled with a sponge-like mass. In both the foliaceous and tectiform calcars the edge may or may not be provided with minute teeth.

THE WINGS. Not very much attention has been paid to the taxonomic characters in the wings of the *Fulgoridæ*. This is perhaps due to three reasons: (1) The fore wings of *Fulgoridæ* occur quite commonly in three forms; a very short wing with reduced venation covering the basal segments of the abdomen only, brachypterous; a wing of moderate length covering most of the abdomen and with fairly well developed venation, kœlopterous; and lastly a wing usually longer than the abdomen frequently much longer with fully developed venation, macropterous; (2) the branching of the longitudinal veins are not constant either for the genus or species; (3) the position of the cross veins is very variable and the number is not constant. Yet in spite of these objections the wings furnish good characters and I feel sure that no satisfactory classification of the higher groups of this family will ever be made without taking into consideration the wing characters.

Just what are the factors that produce brachypterous, kœlopterous or macropterous wings is one of the many unsolved questions in biology today. The reduced wings are found in certain groups only and so far as I know are never found in the following subfamilies: *Fulgorinæ, Flatinæ, Acanaloniнæ, Achilinæ, Derbinæ, Cixiinæ.* Brachypterous and kœlopterous wings are fairly common in the subfamily *Dictyopharinæ,* occur about as commonly as macropterous wings in the *Delphacinæ,* and are all but the rule in the subfamily

Issinæ. That this is not determined by environment would seem to be settled by the fact that brachypterous and macropterous forms, or kœlopterous and macropterous forms of the same species occur on the same host plants at the same time. That the factors are hereditary would seem in accord with all known facts but would require experimental proof before it can be established.

In spite of the fact that the longitudinal veins are not always constant either within the genus or species they are constant enough to furnish good characters. On the basis of wing venation the *Fulgoridæ* of Eastern North America fall into eight groups. Group one includes the subfamily *Fulgorinæ* and is distinguished by the following points: subcosta and radius are not united save for a short distance at the base, radius and medius are united for a considerable distance, cubitus is provided with several accessory veins, the second and third anals are united into a common stem, the surface of the fore wing is reticulated by many cross veins and the hind wing has the anal area reticulate. Group two includes the subfamily *Flatinæ*, it may be distinguished as follows: costa is distant from the margin of the wing and united with it by a series of transverse veinlets; the other veins are distinct and have many accessory veins, second and third anal distinct. The third group includes the subfamily *Acanaloninæ*. This group has the costal vein distinct from the margin but not connected by transverse veinlets, the other veins are distinct and connected by reticulating veinlets, cubitus is unbranched. Group four includes the subfamilies *Achilinæ, Derbinæ* and *Cixiinæ*. The principal character in this group is that subcosta and radius are united for a considerable distance from the base. Group five includes the subfamily *Dictyopharinæ*. The members of this subfamily in our fauna have subcosta and radius completely united and with medius and cubitus distinctly two branched before the apical reticulate area. Group six includes the subfamily *Delphacinæ* and is perhaps simply an evolution of group four. Subcosta and radius are united as in that group but the single stem of radius after its separation from subcosta is bent anally and merges for a short distance with medius one plus two only to separate again and appear as a distinct vein like a branch of medius. Group seven includes the *Issinæ* whose wings are generally so reduced either brachypterous or kœlopterous that little can be said about their real character. For the most part the veins are straight and extend from the base to the apex without branching but are con-

nected by many transverse veinlets. Group eight includes our *Tropiduchinæ* which have a venation quite similar to our *Dictyopharinæ*, but costa is distant from the margin of the wing sometimes united by transverse veinlets, and the apical portion of the corium is separated from the basilar portion by a distinct transverse vein, thus paralleling the development of the *Heteroptera*.

THE ABDOMEN. Outside of the genitalia the characters of the abdomen have not been much used. The general shape of the abdomen, whether compressed or depressed is sometimes useful and I have no doubt that other good specific and generic characters await discovery. The abdomen in *Fulgoridæ* consist of eight definite segments with the ninth, tenth and eleventh segments much modified by the genitalia. Typically each segment consists of the usual tergite, sternite and pleurite. The pleurites are modified in that they usually have a broad lateral portion and a broad ventral portion. The first and second segments are modified by having their tergites ending in a posteriorly directed process from the metapleura. The pleurites are wanting and the sternites are mostly covered by the metasternum, the coxa and trochanters of the hind legs. The spiracles of these segments are situated dorsally well within the lateral margins and the second pair is usually much larger than the first pair. Segments three to six are usually typical with their spiracles on the lateral faces of the pleurites. Segments seven and eight are usually modified by the genitalia but have a pair of small spiracles on the lateral faces of the pleurites.

THE GENITALIA. The genitalia are useful in some groups especially in the *Delphacinæ* where the male genitalia are the court of last appeal for specific determinations in many genera. In a few other groups they are frequently useful but in many groups they seem to be entirely useless. In the *Delphacinæ* the female genitalia are very similar to the female genitalia in other *Homoptera* and consist of a pair of swollen pygofers on either side of the ovipositors. In the males the ninth segment is modified into the tubular pygofer which opens posteriorly through a more or less circular genital aperture which includes the anal segment and the anal style dorsally. Ventrad the aperture is frequently incised to form the ventral sinus, and dorsad there is an incision, the dorsal sinus (anal emargination), which encloses the anal segment. The angles where the sinuses merge with the genital aperture are sometimes prolonged and form the dorsal (anal) and ventral angles. In a few cases the ventral wall of the

genital aperture is prolonged into variously shaped lobes or plates, which may be known as the genital plates. In a few cases there is a single median tooth on the ventral margin, the genital tooth. Looking directly into the genital aperture one can usually see the diaphragm which almost completely divides the genital chamber into an outer and inner chamber. The dorsal margin of the diaphragm is sometimes straight transverse and is sometimes variously armed or toothed, genital armature, these teeth are frequently prolonged and hook-like, genital hooks. The outer genital chamber contains two style-like plates, the genital styles, which are of various sizes and shapes. The following terms are used in describing them: outer and inner margins; apex with inner and outer angles. The ædægus lies in the inner genital chamber and projects posteriorly through the genital orifice. The tenth abdominal segment is modified into the anal segment which is armed ventrally with one or two hook-like processes, the anal processes. The eleventh segment constitutes the anal style.

Various modifications of the genitalia exist in the other subfamilies but so far as I am aware no one has attempted to homologize the genital structures of the different subfamilies of the *Fulgoridæ*.

CLASSIFICATION

The classification adopted is substantially that of Van Duzee's Catalog of the *Hemiptera* of America North of Mexico (1917). Wherever additional synonomy has been used it is clearly indicated under the genera or species concerned. Otherwise the student is referred to this excellent catalog for matters of nomenclature. As stated elsewhere the writer is far from satisfied with the present arrangement of subfamilies but as our chief interest in this paper is the identification of genera and species a thorough revision of the higher divisions need not concern us greatly.

The key given below is based as far as possible upon two contrasting characters. Having used it repeatedly during the past three years, on material from all parts of the country, no one is more familiar with its weaknesses than the writer. Nevertheless it is an attempt to stabilize our knowledge of the classification of the *Fulgoridæ* and to make easier the path of the beginner. The characters used throughout are what appear to the writer to be the most obvious ones available. These characters have been taken entirely from forms in

our territory and do not necessarily have any significance when applied to extralimital forms. As far as possible I have made an attempt to include all our described forms. A few forms as listed below have not been included for the reasons stated. A few forms have been included on characters which seem to be reliable, although I have seen no specimens. In many genera recourse has been had to color characters, a rather doubtful procedure, while in other genera it has been necessary to resort to genital characters from the one sex or the other, which is apt to prove disappointing if the sex one is trying to identify is the opposite sex to the one used in the key. At the present time the only hope in all such cases is to collect enough material and then by careful comparisons work out both sexes. For economy of time and space the keys to the subfamilies, genera and species are all grouped together, thus avoiding the necessity of searching through several pages in locating any given form.

The following changes in the nomenclature adopted in the Van Duzee Catalog are proposed:

Elidiptera Spinola to Epiptera Metcalf.
Cyclokara vanduzei Ball to Patara vanduzei Ball.
The genus Lamenia Stal in our territory to Herpis Stal as has been suggested by Muir;
The genus Cenchrea Westwood in our territory to Phaciocephalus Kirkaldy;
Stenocranus saccharivorus Westwood to Saccharosydne Kirkaldy;
Stenocranus longicornis Dozier to Megamelus Fieber;
Stenocranus palætus Van Duzee to Megamelus Fieber;
Pissonotus piceus Spooner to Phyllodinus Van Duzee;
Pissonotus crawfordi n. n. for Dicranotropis marginatus Crawford nec Pissonotus marginatus Van Duzee;
Pissonotus foveatus Spooner to Pissonotus quadripustulatus Van Duzee;
Pissonotus variegatus Spooner to Pissonotus quadripustulatus Van Duzee;
Phyllodinus kœbelei Osborn to Phyllodinus flabellatus Ball;
Stobæra quadripustulata Van Duzee to Pissonotus Van Duzee;
Stenocranus breviceps Dozier to Liburnia slossoni Ball;
Liburnia arvensis Fitch to Liburnia pellucida Fabricius;
Megamelus constrictus Crawford to Liburnia Stal.

The following species have not been included in the present review for the reasons stated:

Liburnia culta Van Duzee known from the female sex and I have been unable to place it;
Liburnia furcata Provancher, the male has not been described and I have been unable to place it;

Liburnia seminigra Stal, the male has not been described and I have not been able to place it;
Liburnia unicolor Walker, the type is an immature specimen according to Mr. W. E. China.
Dicranotropis luteivitta Walker, the male genitalia have not been described;

The following species have not been seen by the writer:

Calyptoproctus marmoratus Spinola described from North America
Myndus lunatus Van Duzee
Monopsis tabida Spinola
Aphelonema decorata Van Duzee
Thionia transversalis Melichar described from North America
Ormenis pauperata Melichar
Ormenis relicta Fabricius
Ormenis proxima Walker
Otiocerus francilloni Kirby
Otiocerus reaumurii Kirby
Megamelanus rufivittatus Ball
Pissonotus binotatus Spooner
Pissonotus divaricatus Spooner
Phyllodinus piceus Spooner
Stobæra affinis Van Duzee
Liburnia dolera Spooner

The following species have not been reported previously from America North of Mexico:

Poblicia constellata Walker, Mexican
Acanalonia virescens Stal, Mexican
Cyarda acuminipennis Spinola, West Indian
Cyarda walkeri n. n. for Cyarda conformis Melichar nec. Walker.
Flatoides insularis Melichar, West Indian
Flatoides tortrix Guerin, West Indian
Bakerella maculata Crawford, Mexican

The following new genera are proposed:

Ciocixius for Cixius dorsivittatus Van Duzee
Traxus, orthotype Traxus fulvus n. sp.
Euklastus, orthotype Euklastus harti n. sp.
Neocenchrea for Cenchrea heidemanni Ball.

The following new species are described:

Crepusia glauca
Dictyophara recurva
Scolops parvulus
Epiptera brittoni
Catonia carolina
Catonia luella
Catonia pini
Catonia lunata
Bothriocera drakei
Oliarus montanus
Oliarus texanus
Oliarus vitreus
Oliarus vittatus
Microledrida fulva
Cixius apicalis
Oecleus productus
Myndus truncatus
Bruchomorpha minima
Bruchomorpha decorata
Bruchomorpha bicolor
Bruchomorpha vittata
Bruchomorpha rugosa
Aphelonema rosa
Traxus fulvus
Thionia quinquata
Acanalonia fasciata
Flatoides maculosus
Flatoides concisus
Euklastus harti
Herpis incisa
Herpis australis
Stenocranus arundineus
Megamelanus terminalis
Megamelanus dorsalis
Megamelanus lautus
Megamelus distinctus
Megamelus æstus
Megamelus inflatus
Megamelus uncus
Megamelus anticostus
Pissonotus speciosus
Pissonotus fulvus
Pissonotus nigridorsum
Liburnia triloba
Liburnia gerhardi
Liburnia alexanderi
Liburnia fulvidorsum
Liburnia unda
Liburnia shermani
Liburnia staminata
Liburnia waldeni
Criomorphus conspicuus

KEY TO THE SUBFAMILIES, GENERA AND SPECIES OF THE FULGORIDÆ OF EASTERN NORTH AMERICA

1. Posterior tibiæ with a calcar **557**.....SUBFAMILY DELPHACINÆ 202
   Posterior tibiæ without a calcar **529** 2
2. Fore wings macropterous, clavus granulate or reticulate **501** 3
   Fore wings macropterous or brachypterous, clavus of macropterous wings not granulate or reticulate **518** 45
3. Sides of the clypeus sharply carinate; anal area of hind wings reticulate **504** .....SUBFAMILY FULGORINÆ 34
   Sides of the clypeus not carinate; anal area of hind wings not reticulate 4
4. Costal area with transverse veins; hind tibiæ with one to three spines **498** SUBFAMILY FLATINÆ 13
   Costal area without transverse veins; hind tibiæ without spines **497** SUBFAMILY ACANALONIINÆ (Genus *Acanalonia*) 5

ACANALONIA

5. Vertex conically produced **124**.....*Acanalonia conica* Say
   Vertex not conically produced, at most triangular before **133**..... 6
6. Size small, less than 5 mm. in length **118**.....*A. pumila* Van Duzee
   Size larger, more than 7 mm. in length..... 7

* Numbers in blackface refer to figures on the plates.

7. Color green or rosaceous, usually with two brown stripes on the lateral margins of the vertex and thorax which extend along the sutural margins to the apex of the clavus 12 8

Color green, without brown stripes 9

8. Venation rather simple; last ventral segment of the female not produced 558 *A. fasciata* Metcalf

Venation strongly reticulate; last ventral segment produced, notched at the tip 559 ..... *A. bivittata* Say

9. Vertex flat, not rounded before 130 ..... *A. virescens* Stal

Vertex not flat, strongly rounded before 133 10

10. Mesonotum without median carina; fore wings short and broad, not marked with fuscous points on the apical margin 132 11

Mesonotum with an evident median carina; fore wings longer, marked with fuscous points on the apical margin 133 12

11. Fore wings shaded with fuscous along the claval suture; second branch of medius with three branches arising at about the same point; vertex truncate 131 ..... *A. concinnula* Fowler

Fore wings not shaded along the claval suture; second branch of medius branching into two veins, the posterior one again branched; vertex broadly rounded 132 ..... *A. immaculata* Kirkaldy

12. Length 10-11 mm.; costal margin of the wing broadly rounded *A. latifrons* Walker

Length 14-15 mm.; costal border of the fore wings nearly straight posteriorly ..... *A. servillei* Spinola

SUBFAMILY FLATINÆ

13. Wings narrowed apically 39 14

Wings not narrowed apically 13 17

14. Wings three or four times as long as broad, with the apical margin obliquely truncate 40 ..... Genus *Cyarda Walker* 15

Wings but little longer than broad, produced into an acute point 41 *Rhynchopteryx caudate* Van Duzee

CYARDA

15. Vertex narrow, usually not more than twice as broad as long 136 *Cyarda melichari* Van Duzee

Vertex broader, usually more than three times as broad as long 138.... 16

16. Vertex with a distinct transverse carina basally; size small, 8 mm. 138 *C. walkeri* Metcalf

Vertex without transverse carinæ; size large, 11 mm. 139 *C. acuminipennis* Spinola

17. Vertex short, nearly linear 10 ..... Genus *Ormenis* Stal 18

Vertex triangular, produced 145 ..... Genus *Flatoides* Guerin 26

ORMENIS

18. Color light 19
Color dark with evident pruinosity when fresh 13....*Ormenis pruinosa* Say

19. With one sub-apical line on the fore wings 498 20
With two sub-apical lines on the fore wings 499 22

20. Head and thorax green, marked with red 10.....*O. rufifascia* Walker
Head and thorax not marked with red 21

21. Sub-apical line widely separated from the apical border
O. venusta Melichar
Sub-apical line near the apical border.....*O. pauperata* Melichar

22. Size small, 5 mm.....*O. proxima* Walker
Size larger, 8-10 mm 23

23. Frons with median carina well elevated; mesonotum yellowish or brownish testaceous, sharply contrasted with green wings 141...*O. chloris* Melichar
Frons with median carina indistinct; mesonotum not sharply contrasted with the wings 144 24

24. Wings pale with brown spots.....*O. contaminata* Uhler
Wings without brown spots 25

25. Both sub-apical lines united with the costal nerve 499
O. septentrionalis Spinola
The last sub-apical line not reaching the costal border 500
O. relicta Fabricius

FLATOIDES

26. Hind tibiæ with three spines before the apex; fore wings light buff, heavily spotted with large black spots 17.....*Flatoides maculosus* Metcalf
Hind tibiæ with two spines before the apex; fore wings variously colored 27

27. Color blackish fuscous, unmarked 16.....*F. fuscus* Van Duzee
Color lighter, more or less strongly marked with darker 15 28

28. Vertex nearly twice as long as broad 147 29
Vertex not twice as long as broad 151 30

29. Color ochraceous green, with a transverse fuscous band at the apex of the clavus and numerous fuscous flecks.....*F. tortrix* Guerin
Color ochraceous yellow with a fuscous stripe along the claval suture and then diagonally to the costal margin.....*F. insularis* Melichar

30. Vertex acute at the apex; anterior margin of the pronotum not notched 149 31
Vertex obtuse at the apex; anterior margin of the pronotum notched 152 33

31. Vertex twice as broad as its median length 150 32
Vertex not twice as broad as it median length 151.....*F. acutus* Uhler

32. Color ochraceous buff with a broad transverse fuscous band at the base and at the apex of clavus.....*F. concisus* Metcalf
Color greenish without evident transverse bands .....*F. punctatus* Walker

33. Frons nearly smooth; vertex not produced 152.....*F. signatus* Melichar
Frons with two prominent rolls near the base; vertex produced 154, 155
F. scabrosus Melichar

SUBFAMILY FULGORINÆ

34. Head strongly produced 156..... 35
Head not strongly produced 163..... 37

35. Cephalic process expanded apically; lateral carinæ of the vertex crenulate 156.....*Scolopsella reticulata* Ball
Cephalic process narrowed apically; lateral carinæ of vertex not crenulate 159.....Genus *Amycle* Stal 36

AMYCLE

36. Cephalic process narrow, elongate 159.....*Amycle vernalis* Manee
Cephalic process broader 160.....*A. saxatilis* Van Duzee

37. Ninth abdominal segment elongate, quinquecarinate
Calyptoproctus marmoratus Spinola
Ninth abdominal segment not elongate, not quinquecarinate..... 38

38. Posterior border of pronotum with a transverse carina 163
Crepusia glauca Metcalf
Posterior border of pronotum without a transverse carina 165..... 39

39. Vertex short with a distinct sulcus between vertex and frons 172
Genus *Poblicia* Stal 42
Vertex longer, produced anteriorly 165.....Genus *Cyrpoptus* Stal 40

CYRPOPTUS

40. Medius and cubitus of the fore wings forked at about the same distance from the base; fore wings opaque 501.....*Cyrpoptus belfragei* Stal
Medius forked much nearer the base than cubitus; apex of the fore wings semitransparent 502 41

41. Apex of the fore wings with a diagonal transparent vitta; base not clouded with fuscous; wings strongly flaring.....*C. reineckei* Van Duzee
Apex of the fore wings without a diagonal transparent vitta; base clouded with fuscous; wings not strongly flaring.....*C. nubeculosus* Stal

POBLICIA

42. Fore wings tricolored; base greenish; apex fuscous with a sub-apical transverse vitta transparent 9.....*Poblicia constellata* Walker
Fore wings not tricolored, no sub-apical transparent vitta..... 43

43. Color pale ochraceous 4.....*P. misella* Stal
Color fuscous or blackish 5..... 44

44. Color fuscous, veins and veinlets pale.....*P. fuliginosa* Oliver
Color blackish, veins and veinlets black.....*P. thanatophana* Kirkaldy

45. Macropterous wings with subcostal vein branching to form a distinct post nodal cell or post nodal cells; no brachypterous forms **518**..... 104
Macropterous wings with subcostal vein not branching to form a distinct post nodal cell; brachypterous forms common **509**..... 46

46. With a distinct cross vein from costal margin to apex of clavus dividing the fore wings into a distinct corium and membrane with many cross veins **505**.....SUBFAMILY TROPIDUCHINÆ 47
With no distinct cross vein from costal margin to apex of clavus **508** 49

SUBFAMILY TROPIDUCHINÆ

47. Frons with a median carina **180**..... 48
Frons without a median carina **178**.....*Pelitropis rotulata* Van Duzee

48. Costal cross veins present; vertex as long as the mesonotum **506**
Neurotmeta sponsa Guerin
Costal cross veins absent; vertex shorter than the mesonotum **507**
Monopsis tabida Spinola

49. Lateral margins of the pronotum equalling its median length; head narrower than the mesonotum **201**.....SUBFAMILY DICTYOPHARINÆ 50
Lateral margins of the pronotum shorter than its median length; head usually as broad as the mesonotum **215**.....SUBFAMILY ISSINÆ 68

SUBFAMILY DICTYOPHARINÆ

50. Vertex produced in front of the eyes; anterior femora simple **184**.... 52
Vertex transverse; anterior femora foliaceous **182, 530**
Genus *Phyllescelis* Germar 51

PHYLLOSCELIS

51. Fore wings pale, veins brown, dotted with white **8**.....*P. pallescens* Germar
Fore wings black, veins uniform black or broadly pale yellow **6**
P. atra Germar

52. Fore wings pale, transparent green, much longer than the abdomen; vertex not suddenly constricted in front of the eyes; cephalic process triangular **204**.....Genus *Dictyophara* Germar 64
Fore wings coreaceous, equal to or slightly longer than the abdomen; vertex suddenly constricted in front of the eyes; cephalic process very slender, nearly parallel-sided **184**.....Genus *Scolops* Schaum 53

SCOLOPS

53. Fore wings densely and uniformly reticulated apically **52**..... 54
Fore wings with only a few irregular cross veins apically **53**..... 55

54. Reticulations of the fore wings small, the veins margined with darker; cephalic process rather slender **184**.....*Scolops sulcipes* Say
Reticulations of the fore wings large, not margined; cephalic process stouter **185**.....*S. osborni* Ball

55. Cephalic process with the lateral margins nearly straight lines sometimes converging apically 188 56
Cephalic process suddenly narrowed in front of the eyes, the lateral margins nearly parallel to the apex 192 58

56. Cephalic process slender; size small, less than 5 mm. 186 *S. parvulus* Metcalf
Cephalic process stout 187 57

57. Cephalic process short; the margins of the frons somewhat expanded toward the apex of the cephalic process giving it an inflated appearance 187 ..... *S. hesperius* Uhler
Cephalic process long, tapering anteriorly, not inflated 188
S. grossus Uhler

58. Costal vein mostly white, the costal cell white 53 59
Costal vein alternately dark and pale, the costal cell not white 60

59. Cephalic process shorter than clavus; veins of the fore wings nearly uniform 190 ..... *S. angustatus* Uhler
Cephalic process longer; veins of the fore wings distinctly alternate with dark and light 192 ..... *S. perdix* Uhler

60. Color green ..... *S. viridis* Ball
Color not green 61

61. Cephalic process short 194 62
Cephalic process long 196 63

62. Cephalic process stout, at least four times as long as the diameter of the eye 194 ..... *S. desiccatus* Uhler
Cephalic process slender, not more than twice as long as the diameter of the eye 195 ..... *S. robustus* Ball

63. Cephalic process very slender, parallel sided 196 ..... *S. spurcus* Uhler
Cephalic process stouter, somewhat tapering 197 ..... *S. vanduzei* Ball

DICTYOPHARA

64. Many of the cross veins of the fore wings meeting each other, thus forming a few regular transverse veins 509 ..... *Dictyophara dioxys* Walker
Cross veins many, irregularly placed, not forming transverse veins 510 65

65. Vertex at least twice as long as its width between the eyes 199 66
Vertex scarcely longer than its width between the eyes 205 67

66. Cephalic process slender, intermediate carinæ of the frons nearly parallel, plates longer than the ovipositor 199 ..... *D. microrhina* Walker
Cephalic process stout, nearly parallel sided; intermediate carinæ of the frons not parallel; ovipositors slightly longer than the plates 201
D. recurva Metcalf

67. Lateral carinæ of the frons lined with black basally; female plates short 562 ..... *D. florens* Stal
Lateral carinæ of the frons concolorous; female plates long 563
D. lingula Van Duzee

SUBFAMILY ISSINÆ

68. Fore wings short, usually shorter than the abdomen and not covering the lateral margins 37 69
Fore wings longer than the abdomen, broader, covering the lateral margins 62 90

69. Fore and middle tibia expanded 531 .....Genus *Fitchiella* Van Duzee 71
Fore and middle tibia not expanded 70

70. Clypeal suture not evident, head triangularly produced, face more or less horizontal 216 .....Genus *Bruchomorpha* Newman 73
Clypeal suture evident, head not triangularly produced, face vertical 236 Genus *Aphelonema* Uhler 84

FITCHIELLA

71. Nasal process expanded apically, knob like 207 ..*Fitchiella robertsoni* Fitch
Nasal process not expanded apically 210 72

72. Nasal process viewed dorsally, obtuse 209 .....*F. fitchi* Melichar
Nasal process viewed dorsally, acute 210 .....*F. melichari* Ball

BRUCHOMORPHA

73. Body and wings black, often with a pale dorsal vitta 51 74
Body and wings mostly pale 57 81

74. Body and wings black without pale median vitta; legs uniformly black 75
Body with a pale median vitta; legs in part at least pale 76

75. Size large, robust; the lateral carinæ of the mesonotum strongly elevated *Bruchomorpha tristis* Stal
Size small, slender; the lateral carinæ of the mesonotum faint *B. minima* Metcalf

76. Nasal process protuberent, concave ventrally 218 77
Nasal process not protuberent, not concave ventrally 221 79

77. Dorsal vitta evident extending from the apex of the head to the apex of the abdomen 51 .....*B. dorsata* Fitch
Dorsal vitta only faintly indicated on the head 78

78. Nasal process viewed from above centrally compressed; lateral carinæ sinuate 215 .....*B. oculata* Newman
Nasal process not compressed; lateral carinæ not sinuate 217 *B. nasuta* Stal

79. Nasal process upturned at the apex; dorsal vitta broad, extending to the apex of the brachypterous wings 219 .....*B. suturalis* Melichar
Nasal process not upturned at the apex 221 80

80. Dorsal vitta evident, extending to the apex of the mesonotum 55 *B. vittata* Metcalf
Dorsal vitta not extending to apex of mesonotum .....*B. pallidipes* Stal

81. Wings strongly rugose 56 82
Wings not strongly rugose 83

82. Nasal process produced, concave ventrally, nearly unicolorous 222 *B. rugosa* Metcalf
Nasal process not produced, not concave ventrally 223 *B. decorata* Metcalf

83. Nasal process slightly protuberent, not concave ventrally, an evident stripe on each side of the apex of the vertex across the eyes to the apex of the abdomen 30 224.....*B. bicolor* Metcalf
Nasal process not at all protuberent, unicolorous 225.....*B. jocosa* Stal.

APHELONEMA

84. Vertex short, transverse 228..... 85
Vertex more elongate, nearly as long as pronotum, six-sided 236..... 88

85. General color pale ochraceous yellow or blackish fuscous..... 86
General color bright red 2.....*Aphelonema rosa* Metcalf

86. Frons elongate, clypeus black 229.....*A. obscura* Van Duzee
Frons transverse, clypeus not black 231..... 87

87. General color of the body pale ochraceous buff.....*A. simplex* Uhler
General color of the body darker.....*A. decorata* Van Duzee

88. Frons almost parallel-sided; intermediate carinæ not strongly arched 233 *A. bivittata* Ball
Frons nearly circular; intermediate carinæ strongly arched 235..... 89

89. Fore wings rugose 58.....*A. rugosa* Ball
Fore wings not rugose 59.....*A. histrionica* Stal

90. Fore wings reticulate, venation not evident 60..... 91
Fore wings with the longitudinal veins evident 65..... 92

91. Vertex triangularly produced anteriorly 60...*Misodema reticulata* Melichar
Vertex obtusely produced anteriorly; body hairy 61 *Dictyonissus griphus* Uhler

92. General surface of the wings rugulose; vertex broadly emarginate anteriorly 62.....*Traxus fulvus* Metcalf
General surface of the wings not much roughened; vertex not broadly emarginate anteriorly 64..... 93

93. Cubitus and medius branching 514..... 94
Cubitus of the fore wing unbranched 515..... 96

94. Hind tibia with two spines 533.....*Issus servillei* Spinola
Hind tibia with four or five spines 534..... 95

95. Vertex transverse, rounded anteriorly, wings broadly expanded at the base, form oval 64.....*Picumna ovatipennis* Walker
Vertex elongate, triangularly produced anteriorly, fore wings not expanded at the base, form elongate 65.....*Issomorphus maculatus* Melichar

96. Fore wings short, not twice as long as broad; hind wings small 66 Genus *Hysteropterum* Amyot & Serville 97
Fore wings longer, twice as long as broad; hind wings broad with a distinct incision between first and second anal vein 67 Genus *Thionia* Stal 98

HYSTEROPTERUM

97. Color dark brown; the fore wings with numerous round points; anterior margin of the vertex broadly sinuate between the eyes 246
Hysteropterum punctiferum Walker
Color ochraceous orange, the wings clouded with brown; anterior margin of the vertex nearly straight between the eyes, indented medianly 247
H. auroreum Uhler

THIONIA

98. Vertex broader than long 250 99
Vertex as long or longer than broad 256 100

99. Basal margins of the frons nearly straight between the eyes; fore wings unicolorous with dark veins 249 ..... *Thionia simplex* Germar
Basal margins of the frons broadly concave between the eyes; fore wings variegated 251 ..... *T. elliptica* Germar

100. Frons slightly arched with a bright yellow transverse band
T. transversalis Melichar
Frons not arched, without a transverse band 101

101. Vertex acutely produced anteriorly; cells of fore wings with minute dark points 252 ..... *T. producta* Van Duzee
Vertex rounded or only obtusely angulate anteriorly; fore wings variegated 256 102

102. Vertex rounded anteriorly; fore wings with an ocellated spot near the apex 254 ..... *T. ocellata* Melichar
Vertex angularly produced anteriorly; fore wings variegated 256 103

103. Vertex strongly five-angled, the lateral margins flaring anteriorly 255
T. quinquata Metcalf
Vertex obtusely produced, not five-angled, lateral margins parallel 256
T. bullata Say

104. Fore wings overlapping at the apex 72 ..... SUBFAMILY ACHILINÆ 105
Fore wings not overlapping at the apex 124

105. Pronotum short, collar-like; vertex not much produced, with median carina 266 ..... Genus *Catonia* Uhler 113
Pronotum not collar-like; vertex produced, with median sulcus 258
Genus *Epiptera* Metcalf 106

EPIPTERA

106. General color blackish, nearly uniform 112
General color brownish variegated with grayish 107

107. Frons black with a broad band of white across the apex 49 111
Frons not black, not banded with white 47 108

108. Clypeus distinctly darker than the frons 47 109
Clypeus not distinctly darker than the frons 48 110

109. Vertex longer than its basal width; size smaller, 7 mm. 258
Epiptera floridæ Walker
Vertex not longer than its basal width; size larger, 8-10 mm. 259
E. septentrionalis Provancher

110. Vertex broader than long; frons irrorate 48.....*E. variegata* Van Duzee
Vertex as long as broad or longer; frons not irrorate, pale with a distinctly darker brown band basally 261.....*E. slossoni* Van Duzee

111. Clypeus brown; vertex obtusely angulate anteriorly 262.....*E. pallida* Say
Clypeus black; vertex broadly rounded anteriorly 263...*E. brittoni* Metcalf

112. Vertex elongate, twice as long as broad 264.....*E. colorata* Van Duzee
Vertex as long as broad 265.....*E. opaca* Say

CATONIA

113. Veins of the fore wings impunctate 73..... 114
Veins of the fore wings distinctly punctate 14..... 116

114. Fore wings uniform brown in color, a few of the cross veins sometimes marked with paler, size larger about 6 mm..... 115
Fore wings blackish uniformly spotted with small pale spots, size smaller about 3 mm.....*Catonia luella* Metcalf

115. Frons uniformly black; clypeus paler, strongly contrasted 70
C. dimidata Van Duzee
Frons transversely banded with pale 69.....*C. impunctata* Fitch

116. Fore wings with incomplete transverse veinlets in the cells
C. grisea Van Duzee
Fore wings without transverse veinlets in the cells..... 117

117. Face unbanded..... 118
Face conspicuously banded 70..... 119

118. Frons with a short white bar at the middle and at the apex, colors darker, size larger, about 6 mm.....*C. carolina* Metcalf
Frons without the white bars, color mostly tawny, size smaller, about 5 mm.
C. pumila Van Duzee

119. Middle light band narrow, basal and apical bands brownish..... 120
Middle light band broad..... 121

120. Wings variegated; lateral margins of the frons distinctly punctate
C. pini Metcalf
Wings unicolorous except the punctate veins.....*C. bicinctura* Van Duzee

121. Basal and apical bands brown, the latter with a distinct pale transverse mark along the clypeal border.....*C. lunata* Metcalf
Basal and apical bands black..... 122

122. Frons much narrowed between the eyes, broadened apically; size larger 7 mm.....*C. nava* Say
Frons not much narrowed between the eyes; not much broadened apically; size smaller, 5 mm. or less..... 123

123. Color strongly contrasted, mesonotum variegated.....*C. cinctifrons* Fitch
Color not strongly contrasted, mesonotum unicolorous....*C. picta* Van Duzee

124. Carinæ distinct on the mesonotum; frontal ocellus usually evident **274**
SUBFAMILY CIXIINÆ 125
Carinæ indistinct on the mesonotum; frontal ocellus wanting
SUBFAMILY DERBINÆ 172

SUBFAMILY CIXIINÆ

125. Posterior tibiæ armed with one to three spines before the apex **538**.... 126
Posterior tibiæ without spines before the apex **539**..... 149

126. Posterior margin of the vertex broadly rounded, mesonotum tricarinate **290** 139
Posterior margin of the vertex angulate, parallel to the posterior margin of the angulate pronotum; mesonotum usually quinquecarinate **274**
Genus *Oliarus* Stal 127

OLIARUS

127. Fore wings pellucid, more or less mottled with brown **74**..... 129
Fore wings smoky brown, at least apically **75**..... 128

128. Fore wings uniform smoky brown, stigma and narrow costal margin pale; size larger, 8 mm.....*Oliarus cinnamomeus* Provancher
Stigma and costal margin not paler; apical third of the fore wings usually sharply darker; size smaller, 6 mm.....*O. humilis* Say

129. Median tooth of the male pygofer simple, acute **569**..... 132
Median tooth of the male pygofer broadly expanded apically **566**..... 130

130. Vertex about as broad as median length; male styles not broadly expanded apically **566**.....*O. montanus* Metcalf
Vertex narrow, produced, genital styles of the male broadly expanded apically **568**..... 131

131. Wing veins uniformly punctate, fuscous markings not confined to the veins and cross veins, female with a distinct fuscous longitudinal vitta at the apex of the fore wings.....*O. placitus* Van Duzee
Wing veins not uniformly punctate, fuscous markings confined to narrow lines on the veins and cross veins.....*O. difficilis* Van Duzee

132. Fore wings distinctly and uniformly punctate..... 134
Fore wings impunctate or nearly so..... 133

133. Size smaller, 4-5 mm.; fore wings nearly uniform in color, or infuscated apically **569**.....*O. franciscanus* Stal.
Size larger, 8-9 mm.; fore wings with heavy fuscous markings, principally on apical veins and cross veins.....*O. slossoni* Van Duzee

134. Frons with a broad white mark on either side next the base of the clypeus *O. aridus* Ball
Frons nearly unicolorous, carinæ only paler..... 135

135. Frons not greatly narrowed between the eyes; median tooth of the male pygofer nearly as long as the pygofer; clypeus usually paler than the frons 571 ..... *O. quinquelineatus* Say
Frons much narrowed between the eyes; median tooth of the male pygofer shorter than the pygofer 573 136

136. Size smaller, less than 5 mm. 137
Size larger, 8-10 mm. 138

137. Genital styles of the male longer than the ventral sinus; anal segment hood-like 572 ..... *O. texanus* Metcalf
Genital styles of the male barely equalling the ventral sinus; anal segment not hood-like 573 ..... *O. vittatus* Metcalf

138. General color blackish, polished; male plates very slender basally, the apices strongly recurved and ridged so as to appear coiled 574 *O. vitreus* Metcalf
General color tawny; male plates broader basally, their apices broad and flat 575 ..... *O. vicarius* Walker

139. Frons as broad as long or broader 279 140
Frons longer than broad 285 142

140. Vertex short, transverse, about four times as broad as long 278 *Monorachis sordulentus* Uhler
Vertex elongate, about one and one-half times as broad as long 280 Genus *Microledrida* Fowler 141

MICROLEDRIDA

141. Color light testaceous yellow; male genital styles not produced into a long reflexed process at the apex 576 ..... *Microledrida flava* Metcalf
Color fuscous; male genital styles produced into a long reflexed process at the apex 577 ..... *M. asperata* Fowler

142. Posterior margin of the pronotum broadly rounded; fore wings nearly vertical 282 ..... *Ciocixius dorsivittatus* Van Duzee
Posterior margin of the pronotum deeply notched; fore wings not vertical 284 ..... Genus *Cixius* Latreille 143

CIXIUS

143. Wings with the basal half infuscated, apical half milky hyaline, more or less marked with fuscous; median tooth of male pygofer longer than its basal width 78, 578 ..... *Cixius apicalis* Metcalf
Wings more or less marked with fuscous but not with basal and apical areas distinctly different in color; median tooth of male pygofer shorter than it basal width 582 144

144. Vertex longer than basal width, veins impunctate 286 ..... *C. cultus* Ball
Vertex shorter than basal width, veins punctate 289 145

145. Frons and clypeus black with pale carinæ 146
Frons dark, clypeus distinctly paler 148

146. Wings evidently white, basal band blackish; genital styles of the male strongly reflexed apically 579.....*C. stigmatus* Say
Wings more or less marked with fuscous; genital styles of the male broadly broadly rounded apically, broadly meeting in the median line 580... 147

147. Vertex broadly triangular 288.....*C. misellus* Van Duzee
Vertex shorter, transverse, rounded before 289.....*C. colæpium* Fitch

148. Anal processes of the male very long; female with base of fore wings strongly infuscated 582.....*C. basalis* Van Duzee
Anal processes of the male short; base of the fore wings not infuscated 583
C. pini Fitch

149. Antennæ inserted anteriorly to the eyes; eyes with an anterior sinus 294
Genus *Bothriocera* Burmeister 150
Antennæ inserted below the eyes; eyes with a ventral sinus..... 155

BOTHRIOCERA

150. General color blackish fuscous, wings strongly marked with blackish fuscous 152
General color ochraceous, wings marked with tawny..... 151

151. Fore wings with two indistinct transverse tawny bands, one at the apex of the clavus and one subapical, basal half of the wings unmarked 80
Bothriocera undata Fabricius
Fore wings rather heavily marked with tawny, basal half heavily marked 81
B. drakei Metcalf

152. Apical border of the wings hyaline 82..... 153
Apical borders of the wings fuscous 84..... 154

153. With a row of distinct fuscous points in the cells near the apex 82
B. tinealis Burmeister
Without a row of distinct fuscous points in the cells near the apex 83
B. westwoodi Stal

154. Vertex paler than the mesonotum; hyaline spots on the fore wings irregular in outline 83.....*B. bicornis* Fabricius
Vertex not paler than the mesonotum; hyaline spots on the fore wings rather regular in outline.....*B. signoreti* Stal

155. Vertex narrow, trough-like; lateral carinæ well elevated 297..... 156
Vertex broader, lateral carinæ not strongly elevated 304
Genus *Myndus* Stal 162

156. Vertex narrowed anteriorly 295.....*Oeclidius nanus* Van Duzee
Vertex narrowed posteriorly 300.....Genus *Oecleus* Stal 157

OECLEUS

157. Male pygofer with the median tooth finger-like or tongue-like 588..... 158
Male pygofer with the median tooth quadrate or triangular 592, 160

158. Vertex not strongly produced in front of the eyes 299.....159
Vertex strongly produced in front of the eyes; lateral margins sinuate 297
Oecleus decens Stal

159. Lateral margins of the vertex nearly touching posteriorly, strongly widened anteriorly; anal segment of the male strongly produced and deflexed beyond the pygofer 588.....*O. productus* Metcalf
Lateral margins of the vertex nearly parallel; anal segment of the male not strongly produced 589.....*O. fulvidorsum* Ball

160. Vertex strongly produced; lateral margins sinuate; median tooth of male pygofer obtuse apically 590.....*O. lineatus* Ball
Vertex not strongly produced; lateral margins not sinuate; median tooth of male pygofer acute apically 592..... 161

161. Median tooth of male pygofer triangular, genital styles barely longer than the tooth; vertex rather broad anteriorly 301, 591.....*O. obtusus* Ball
Median tooth quadrate at the base, apical portion triangular acute, genital styles longer than the tooth; vertex narrower anteriorly 302, 592
O. borealis Van Duzee

MYNDUS

162. Frons twice banded with black..... 169
Frons not twice banded with black..... 163

163. Color uniform ochraceous orange, eyes darker.....*Myndus fulvus* Osborn
Color not uniform ochraceous orange..... 164

164. Head and thorax black; fore wings black with pale costal margin and dorsal saddle 20.....*M. slossoni* Ball
Head and thorax not black..... 165

165. Frons marked with fuscous bands or spots..... 166
Frons immaculate or nearly so..... 167

166. Frons with a pair of black spots between the carinæ at the base, larger, 5 mm.
M. radicis Osborn
Frons with a lunate fuscous mark at the apex; smaller, 4 mm.
M. lunatus Van Duzee

167. Costal border of fore wings broadly whitish.....*M. enotatus* Van Duzee
Costal border of fore wings concolorous..... 168

168. Vertex narrow, elongate; color greenish 309.....*M. viridis* Ball
Vertex broad; color dull pale tawny 310.....*M. pusillus* Van Duzee

169. Fore wings vittate with brown apically; genital styles of the male broadened apically 599.....*M. pictifrons* Stal
Fore wings not vittate with brown apically; genital styles of the male not broadened apically 600..... 170

170. Genital styles obliquely truncate apically, the inner angles strongly produced 600.....*M. truncatus* Metcalf
Genital styles reflexed apically, the inner angle not produced 601.....171

171. Sides of the vertex converging to the apex; veins of the fore wings brown, not concolorous 313.....*M. sordidipennis* Stal
Sides of the vertex parallel in front of the eyes; veins of the fore wings paler 314.....*M. delicatus* Van Duzee

SUBFAMILY DERBINÆ

172. Clavus open 519 173
Clavus closed 522 192

173. Antennæ with appendages 478 .....Genus *Otiocerus* Kirby 174
Antennæ without appendages 479 184

OTIOCERUS

174. Wings with conspicuous round dusky spots in the cells 27 175
Wings without conspicuous round dusky spots in the cells 33 181

175. General color of the wings light 34 176
General color of the wings dark rose 27 .....*Otiocerus degeerii* Kirby

176. Wings with a conspicuous dusky band 35 177
Wings without a band 34 .....*O. abbotii* Kirby

177. Apical margin of the fore wings with a row of black spots alternating with the veins 35 178
Black spots not placed in a marginal row 179

178. Apex of the cephalic process with a black line laterally .....*O. wolfii* Kirby
Apex of the cephalic process without a black line laterally ..*O. amyotii* Fitch

179. Fore wings with a large black spot on the sutural margin and four smaller ones in a square .....*O. signoretii* Fitch
Fore wings without a large black spot and four smaller ones in a square 180

180. Band on the wings broad .....*O. reaumurii* Kirby
Band on the wings narrow, interrupted .....*O. francilloni* Kirby

181. General color of the wings dark 33 .....*O. stollii* Kirby
General color of the wings light 28 182

182. Wings with a conspicuous band 28 183
Wings without a conspicuous band 36 .....*O. schellenbergii* Kirby

183. Head with a lateral sanguineous stripe; band on the wings sanguineous *O. coquebertii* Kirby
Head without a lateral sanguineous stripe; band on the wings dusky *O. kirbyii* Fitch

184. Vertex nearly an equilateral triangle; apical veins of the wing strongly recurved 334 .....*Euklastus harti* Metcalf
Vertex longer than broad; apical veins of the fore wings not strongly recurved 342 185

185. Costa narrow; fore wings with several transverse costal veinlets, not crowded together to give the appearance of a stigma 87 ...Genus *Anotia* Kirby 187
Costa distinctly broader; costal veinlets crowded together to give the appearance of a stigma 25 .....Genus *Amalopota* Van Duzee 186

AMALOPOTA

186. Fore wings milky white, longitudinally banded with fuscous 25 *Amalopota fitchi* Van Duzee
Fore wings pale yellowish with basal and apical thirds transversely banded with fuscous 24 .....*A. uhleri* Van Duzee

ANOTIA

187. First three segments of the abdomen with a mid-dorsal black stripe
Anotia burnetii Fitch
First three segments of the abdomen without a mid-dorsal black stripe 188

188. Apical border of the fore wings with round black spots in the cells **87**
A. bonnetii Kirby
Apical border of the fore wing without round black spots in the cells **88** 189

189. A few of the cross veins marked with fuscous, otherwise fore wings uniformly pale.....*A. robertsoni* Fitch
Fore wings more or less marked with fuscous..... 190

190. Some of the veins of the wings dark in color **89**..... 191
All of the veins of the wings pale, bordered with smoky **88**
A. westwoodi Fitch

191. Fore wings crossed by single smoky band about two-thirds the distance from the base; basal area of the wing white, apical area ochraceous yellow; costal appendage large **89**.....*A. sayi* Ball
Fore wings variously marked with smoky; costal appendage small **90**
A. kirkaldyi Ball

192. Shoulder keels absent or very small **357**..... 193
Shoulder keels well developed **360**..... 194

193. Antennæ with second segment flattened, longer than the width of head across the compound eyes **356**.....*Patara vanduzei* Ball
Antennæ with second segment globular, shorter than the width of head across the compound eyes **484**.....*Mysidia mississippiensis* Dozier

194. Subantennal process absent or very small..... 195
Subantennal process well developed.....Genus *Herpis* Stal 197

195. Medius and cubitus of the fore wings each with two branches, not connected by cross veins **523**.....*Neocenchrea heidemanni* Ball
Medius and cubitus of the fore wings connected by cross veins **524**
Genus *Phaciocephalus* Kirkaldy 196

PHACIOCEPHALUS

196. Lateral carinæ of the vertex strongly elevated; general color ochraceous tawny.....*Phaciocephalus fulvus* Van Duzee
Lateral carinæ of the vertex not strongly elevated; colors paler
P. uhleri Ball

HERPIS

197. Fore wings fuscous or black..... 198
Fore wings grayish white with fuscous clouds in the cells **94**
Herpis maculata Van Duzee

198. Genital styles of the male with an apical tooth **618**..... 199
Genital styles of the male without an apical tooth **617**
H. edentula Van Duzee

199. Inner margin of the genital styles straight **618**.....*H. vulgaris* Fitch
Inner margins of the genital styles sinuate or notched **619**..... 200

200. Apical tooth of the genital styles short, the inner margins of the genital styles deeply notched near the base 619.....*H. incisa* Metcalf
Apical tooth of the genital styles long 620..... 201

201. Apex of the genital styles obliquely truncate 620.....*H. australis* Metcalf
Apex of the genital styles broadly rounded 621.....*H. obscura* Ball

SUBFAMILY DELPHACINÆ

202. Calcar foliaceous or tectiform 557..... 219
Calcar not foliaceous or tectiform 540..... 203

203. Calcar spiniform, without lateral teeth 542..... 208
Calcar cultrate, with a row of marginal teeth, antennæ flattened 540
Genus *Stobæra* Stal 204

STOBÆRA

204. Sides of the frons not parallel 369.....*Stobæra pallida* Osborn
Sides of the frons nearly parallel 371..... 205

205. Frons distinctly lighter in the middle, base and apex darker..... 206
Frons not paler in middle, with base and apex darker..... 207

206. Head narrower than pronotum; anal process trilobed ventrally; genital styles with the inner angles strongly produced 623.....*S. concinna* Stal
Head as broad as pronotum; anal process not trilobed ventrally; genital styles with the inner angles strongly reflexed 624.....*S. tricarinata* Say

207. Vertex distinctly shorter than broad; frons nearly concolorous; larger, 4 mm.....*S. affinis* Van Duzee
Frons light below, dark above; vertex quadrate; smaller, 3 mm. 372
S. minuta Osborn

208. Antennæ foliaceous, half as long as the body; scutellum tricarinate; frons with a single median carina 96.....*Copicerus irroratus* Swartz
Antennæ not foliaceous, short; scutellum quinquecarinate; frons with two median carinæ 19.....Genus *Pentagramma* Van Duzee 209

209. Size small; genital styles of the male short, slender, enclosing a nearly circular area 627.....*Pentagramma minore* Crawford
Size large; genital styles of the male elongate, robust, enclosing an elongate oval area 628.....*P. vittatifrons* Uhler

210. First segment of antennæ flattened; head broader than the pronotum 380
Bostæra nasuta Ball
First segment of antennæ not flattened..... 211

211. Frons nearly circular in outline; antennæ and calcar very short 383
Bakerella maculata Crawford
Frons not circular in outline 385..... 212

212. Frons, pronotum and abdomen with prominent pits
Genus *Laccocera* Van Duzee 213
Frons, pronotum and abdomen without prominent pits..... 214

LACCOCERA

213. Vertex broader than long; colors black and buffy 384
Laccocera vittipennis Van Duzee
Vertex nearly square, colors bright yellow, orange and black 386
L. zonata Van Duzee

214. Anterior and middle femora foliaceous 546
Genus *Phyllodinus* Van Duzee 215
Anterior and middle femora not foliaceous 219

PHYLLODINUS

215. Head as broad as pronotum; brachypterous wings with veins white, apical margin concolorous 102 ..... *Phyllodinus nervatus* Van Duzee
Head narrower than pronotum; brachypterous wings with veins concolorous, apical margin white 103 216

216. Frons with transverse white bands 217
Frons unicolorous ..... *P. nitens* Van Duzee

217. Mesonotum white 218
Mesonotum black ..... *P. piceus* Spooner

218. Frons with indistinct carina between median and lateral carinæ
P. fuscous Osborn
Frons without intermediate carina ..... *P. flabellatus* Ball

219. Frons with two median carinæ 392 220
Frons with one median carina, sometimes forked below the apex of the head 437 221

220. Lateral carinæ of the pronotum reaching the hind margin; head narrower than the mesonotum 389 ..... *Macrotomella carinata* Van Duzee
Lateral carinæ short, divergent, not reaching more than half way to the hind margin of the pronotum; head as broad as the mesonotum 391
Criomorphus conspicuus Metcalf

221. Median carina of the frons running to the posterior margin of the vertex without oblique carinæ to the lateral margins 393
Liburniella ornata Stal
Median carina of the frons forked on or below the apex of head, each branch of the fork running obliquely to the lateral margins of the vertex 453 222

222. Lateral carinæ of the pronotum straight or convergingly curved, usually reaching the hind margin of the pronotum 398 223
Lateral carinæ of the pronotum divergingly curved, not reaching the hind margin 455 ..... Genus *Liburnia* Stal 265

223. Frons narrow, sides nearly parallel; head narrower, produced 400 224
Frons broader, sides not parallel; head broader sometimes produced 416 229

224. Vertex inflated in front of the eyes and then narrowed to the apex 395
Saccharosydne saccharivorus Westwood
Vertex regularly narrowed to the apex 399 ... Genus *Stenocranus* Fieber 225

STENOCRANUS

225. Second antennal segment four times as long as the first; female pygofers cylindrical 494 ..... *Stenocranus similis* Crawford
Second antennal segment not over three times as long as the first 495 226

226. General color bright ochraceous orange, not darker in the lateral compartments of the frons ..... *S. arundineus* Metcalf
General color darker, sometimes distinctly darker in the lateral compartments of the frons 227

227. Frons light brown in the lateral compartments ..... *S. felti* Van Duzee
Frons black in the lateral compartments 228

228. Genital styles broad and contiguous at the base; anal process short, not reaching the ventral margin of the genital aperture 642
S. vittatus Stal
Genital styles slender, not contiguous at the base; anal processes long, reaching the ventral margin of the genital aperture 643 *S. dorsalis* Fitch

229. Median carina of the frons forked below the apex of the vertex, head not much narrowed between the eyes 437 251
Median carina of the frons forked on the apex of the vertex or obscure 419 230

230. When viewed laterally the apex of the head is acute with a faint transverse carina 426 ..... Genus *Megamelanus* Ball 246
When viewed laterally the apex of the head is rounded, without transverse carina 422 231

231. Frons widest above the middle, not or scarcely narrowed between the eyes; vertex scarcely produced in front of the eyes 421
Genus *Kelisia* Fieber 244
Frons widest below, narrowed between the eyes; vertex well produced in front of the eyes 416 232

232. Head nearly as wide as the pronotum; face oval in outline; slender species 419 ..... Genus *Prokelisia Osborn* 243
Head narrower, tapering anteriorly; face not oval, robust species 405
Genus *Megamelus* Fieber 233

MEGAMELUS

233. Genital plates flat 645 234
Genital plates robust, not flat 655 241

234. Anal processes wanting 646 235
Anal processes present 651 239

235. Pygofer of the male strongly inflated 646 236
Pygofer of the male not inflated 649 237

236. Genital styles shorter than the genital plates, calcars very large, as long as the basal segment of the tarsus 645 ..... *Megamelus palœtus* Van Duzee
Genital styles longer than the genital plates, calcars small, not as long as the basal segment of the tarsus 646 ..... *M. inflatus* Metcalf

237. Genital hooks long, reaching the anal segment 647 *M. longicornis* Dozier
Genital hooks wanting 649 238

238. With a pale median dorsal vitta, genital plates ligulate, obtuse 648
M. notulus Germar
Without a pale mid-dorsal vitta, genital plates broadly triangular, acute 649 ..... *M. distinctus* Metcalf

239. Anal processes four, hook-like 650 ..... *M. æstus* Metcalf
Anal processes two 651 240

240. Genital hooks strongly reflexed, hook-like, genital styles obtuse at the apex, not reflexed 651 ..... *M. uncus* Metcalf
Genital hooks elongate, straight, obtuse; genital styles with their apices bent at right angles 652 ..... *M. anticostus* Metcalf

241. Color dark, almost uniform black or piceous 242
Color light, marked with darker 7 ..... *M. angulatus* Osborn

242. Calcar very large, as long as the first segment of the tarsus
M. davisi Van Duzee
Calcar smaller, not as long as the first segment of the tarsus
M. piceus Van Duzee

PROKELISIA

243. Frons very broad at the apex, three times as broad as at base 416
Prokelisia marginata Van Duzee
Frons about twice as broad as at base 419 ..... *P. setigera* Osborn

KELISIA

244. Fore wings vittate with brown, sutural margins pale 109
Kelisia axialis Van Duzee
Fore wings not vittate 245

245. Vertex distinctly longer than broad, with a pale median vitta 423
K. crocea Van Duzee
Vertex barely as long as broad, without a pale median vitta 424
K. parvula Ball

MEGAMELANUS

246. Vertex very long, its length beyond the eyes equal to or greater than the long diameter of the eyes 425 247
Vertex not as long before the eye as the long diameter of the eye 434 250

247. Frons nearly parallel sided and much elongate 426
Megamelanus terminalis Metcalf
Frons broader below, somewhat narrowed between the eyes 430 248

248. Fore wings with a distinct white stigmatal and anal spots 38
M. lautus Metcalf
Fore wings without distinct stigmatal and anal spots 249

249. Wings pale, with fuscous spots apically 122 ..... *M. elongatus* Ball
Wings uniform black 110 ..... *M. dorsalis* Metcalf

250. Color pale green, with a pair of dark red stripes from the apex of the vertex to the apex of the abdomen.....*M. rufivittatus* Ball
Color pale ochraceous yellow, eyes black.....*M. spartini* Osborn

251. Median carina of the frons forked near the middle, the two prongs of the fork widely separated; macropterous forms chiefly 111, 437
Peregrinus maidis Ashmead
Median carina of the frons forked above the middle, the two prongs but slightly separated; brachypterous forms chiefly 221
Genus *Pissonotus* Van Duzee 252

PISSONOTUS

252. Clypeus black..... 253
Clypeus yellow..... 263

253. Pale buffy in color, with distinct pustules on the seventh abdominal segment 115.....*Pissonotus quadripustulatus* Van Duzee
Color darker, without pustules 116..... 254

254. With the apex of the brachypterous wings marked with paler, veins concolorous 117..... 256
With the apex of the brachypterous wings concolorous, veins pale 116 255

255. Apex of the frons broadly white, frons marked with white bars
P. aphidioides Van Duzee
Apex of the frons not marked with white, white bars wanting
P. brunneus Van Duzee

256. Abdomen black, with a broad median vitta brown 117
P. dorsalis Van Duzee
Abdomen without broad vitta..... 257

257. Color almost uniform black, wings sometimes a little paler..... 258
Color ochraceous tawny..... 261

258. Apical markings of the wings in the form of a distinct band..... 259
Apical markings of the wings in the form of spots or wanting
P. ater Van Duzee

259. Anterior and intermediate tibiæ black or nearly so
P. marginatus Van Duzee
Anterior and intermediate tibiæ not black..... 260

260. Anal processes long, nearly reaching the ventral margin; genital plates tubular, surrounding the genital styles basally 673
P. pallipes Van Duzee
Anal processes short, the dorsal angles of the pygofers strongly produced 674.....*P. crawfordi* Metcalf

261. Head concolorous or paler than the pronotum and elytra..... 262
Head and pronotum black or nearly so, sharply contrasted with the paler mesonotum, wings and abdomen.....*P. guttatus* Spooner

262. Anal processes of the male long, reaching the ventral margin of the genital aperture 676.....*P. basalis* Van Duzee
Anal processes of the male short, not reaching the ventral margin of the genital aperture 677.....*P. delicatus* Van Duzee

263. Head, pro- and mesonotum black..... 264
General color pale ochraceous tawny, eyes black.....*P. fulvus* Metcalf

264. Wings black, opaque.....*P. nigridorsum* Metcalf
Wings semitransparent, not black.....*P. speciosus* Metcalf

LIBURNIA

265. Carinæ obscure on the apex of head; vertex broadly rounded in front, not produced 451..... 266
Carinæ distinct on the apex of head; vertex narrow, produced 455..... 273

266. General color of head and thorax light yellow or brown..... 267
General color of head and thorax dark brown or black..... 272

267. Genital styles acute at the apex 681..... 268
Genital styles broad at apex 683..... 270

268. Anal tube without anal processes; frontal carinæ bordered with darker; genital styles claw-like 681.....*Liburnia lutulenta* Van Duzee
Anal tube with one ventral process; frontal carinæ not paler than frons 683..... 269

269. Genital styles lanceolate, broadly divergent; anal processes long, almost reaching the base of the styles 682.....*L. obscurella* Boheman
Genital styles notched internally near the apex; anal processes short 683 *L. analis* Crawford

270. Mesonotum pale between the lateral carinæ black laterally; genital styles broad, short, square at the apex roundly divergent 684 *L. campestris* Van Duzee
Mesonotum not darker laterally..... 271

271. Styles contiguous basally, the apices broadened but divergent 685 *L. rotundata* Crawford
Styles not contiguous basally, their apices mushroom shaped 686 *L. shermani* Metcalf

272. Frons less than twice as long as broad, lateral margins rounded; styles short, lanceolate 687.....*L. occlusa* Van Duzee
Frons twice as long as broad, lateral margins nearly parallel; styles long, acuminate 688.....*L. nigridorsum* Crawford

273. Genital styles acute at apex 689..... 274
Genital styles acute or bifurcate at apex 702..... 286

274. Carinæ of the frons pale not concolorous..... 275
Carinæ of the frons concolorous or nearly so..... 282

275. General color of head and thorax yellow to light brown..... 276
General color of head and thorax brown to black..... 279

276. Macropterous wings vittate with fuscous 112.....*L. slossoni* Ball
Macropterous wings not vittate with fuscous..... 277

277. Frons conspicuously narrowed between the eyes; styles broad, suddenly narrowed at the apex 690.....*L. foveata* Van Duzee
Frons not much narrowed..... 278

278. Genital styles of the male elongate, diverging from each other at an angle of about thirty degrees 691.....*L. constricta* Crawford
Genital styles of the male twisted at the apex, apices strongly divergent 692
L. osborni Van Duzee

279. Legs lineate with darker; genital styles long 693..... 280
Legs not lineate with darker..... 281

280. Styles slender, wings infuscated 693.....*L. gillettei* Van Duzee
Styles broad, wings not infuscated, ciliate 694.....*L. lineatipes* Van Duzee

281. Genital aperture large; styles horizontal, sinuate and flexed at the tip 695
L. pellucida Fabricius
Genital aperture small, nearly circular; styles smaller, divergent not horizontal 696.....*L. consimilis* Van Duzee

282. General color of head and thorax brown or black; frons narrow, black 283
General color of head and thorax yellow to light brown; wings black
L. kilmani Van Duzee

283. Styles widely diverging 699..... 284
Styles more or less curved, nearly parallel 698.....*L. waldeni* Metcalf

284. Styles with basal angles produced 699.....*L. basivitta* Van Duzee
Styles with basal angles not produced..... 285

285. Styles not widely diverging, color black.....*L. andromeda* Van Duzee
Styles widely diverging, color dull brown.....*L. incerta* Van Duzee

286. Styles bifurcate or trifurcate at the apex 702..... 287
Styles obtuse at the apex 704..... 290

287. Dorsal angles of the male pygofer strongly produced 701..... 288
Dorsal angles of the male pygofer not produced 700
L. magnistyla Crawford

288. Macropterous wings vittate with fuscous; vertex, pro- and mesonotum with a broad pale vitta 113.....*L. albolineosa* Fowler
Macropterous wings not vittate with fuscous; vertex, pro- and mesonotum not vittate with pale..... 289

289. Styles terete, not much flattened apically, narrowly arched 702
L. triloba Metcalf
Styles flattened apically, broadly arched 703.....*L. gerhardi* Metcalf

290. Head and thorax yellow, brachypterous wings black, strongly contrasted 31
291
Head and thorax not strongly contrasted in color with the wings 114.... 292

291. Styles together lyre-shaped, apices reflexed; frons black, carinæ pale 704
L. alexanderi Metcalf
Styles obtuse at the apex, diverging 705.....*L. fulvidorsum* Metcalf

292. Color creamy white to light brown 293
Color dark brown to black 298

293. Calcar very large, as long as the basal segments of the tarsus 294
Calcar normal, shorter than the basal segment of the tarsus 295

294. Genital styles gradually narrowed to near the apex then suddenly expanded, stamen-like; anal processes broad triangularly 706
L. staminata Metcalf
Genital styles not stamen-like; nearly parallel margined to the apex; anal processes long, horn-like 707 ..... *L. humilis* Van Duzee

295. Styles broadened at the apex, truncate; pronotum unusually long 708 296
Styles not broadened at the apex; pronotum not unusually long 711 297

296. Pygofer of the male elongate; genital aperture very broad, oval; genital styles strongly diverging 708 ..... *L. detecta* Van Duzee
Pygofers very short; genital aperture nearly circular; genital styles not strongly diverging 709 ..... *L. unda* Metcalf

297. Styles ligulate, following the contour of the genital aperture 710
L. tuckeri Van Duzee
Styles broad, rounded at the apex; reaching the anal tube; genital aperture with the dorsal angles strongly produced 711
L. lateralis Van Duzee

298. Macropterous wings fuscous with a large stigmatal spot pale 114
L. teapæ Fowler
Macropterous wings not fuscous with a large stigmatal spot pale 299

299. Antennæ short, not reaching clypeal margin; styles broad and truncate 713
L. vanduzeei Crawford
Antennæ reaching at least to the clypeal margin 300

300. Male pygofer deeply notched dorsally and produced caudally around the anal segment 714 ..... *L. laminalis* Van Duzee
Male pygofer not deeply notched dorsally and produced caudally 715 301

301. Color black; pronotum white posteriorly; styles with a tooth on their inner margins 715 ..... *L. puella* Van Duzee
Color brown; pronotum not white 302

302. Styles broadly diverging, following the contour of the genital aperture
L. dolera Spooner
Styles concentric, slightly indented apically ..... *L. weedi* Van Duzee

Crepusia glauca n. sp.

Figs. 43, 163, 164, 166

This species may be recognized by the general ochraceous buff color which is strongly sprinkled with black.

Head narrow. Vertex about three times as broad as long. Frons with the base narrow, apex somewhat broadened. Clypeus with the

central area flat, distinct indication of the clypeal grooves. Antennal collar conspicuous, second joint globular. Pronotum truncate anteriorly; median carinæ strongly elevated, transverse carinæ distinct. Fore wings semitransparent; hind wings transparent.

COLOR: General color ochraceous buff, marked with numerous black points which become confluent in various areas making irregular black blotches. Frons heavily marked; tibiæ thrice banded with blackish fuscous. Fore wings with the clavus irregularly marked with black; basal area of the corium more or less marked with black, numerous irregular blotches along the costal margin and an irregular vitta from the claval suture to apical angle; bases of hind wings ochraceous, rest of the wing transparent; veins blackish. Abdomen ochraceous orange dorsally, with the lateral field of each segment heavily marked with black; ventrally, the abdomen is pale ochraceous with the pleural pieces and a broad triangular blotch on the outer margin of each segment black.

Length, apex of head to apex of abdomen 10.4 mm.; to tip of wing 13.1 mm.; wing expanse 35.4 mm.

Holotype ♂. Brownsville, Texas.

Allotype ♀. Nogales, Arizona.

Paratypes 1 ♂. Dragoon, Arizona. 10 ♂ Nogales, Arizona.

Dictyophara recurva n. sp.

Figs. 201, 202, 203, 561

This species may be distinguished from *Dictyophara microrhina* Walker, to which it is closely related, by the more robust cephalic process which is parallel-sided and not tapering as in *D. microrhina* and the genital characters are different.

Vertex more than three times as long as broad, nearly parallel sided and not much narrowed toward the apex; median carina extending from base to apex; genæ with a median carina from the eye, almost to the apex; frons rather broad; clypeal expansion very slight; intermediate carinæ more widely separated than in *D. microrhina;* fore wings very finely reticulate; female pygofers much longer and more slender than in *D. microrhina,* not so deeply curved and not as much constricted at the base; ovipositors slightly exceeding the pygofers with small teeth; subanal plate parallel-sided, reflexed border narrow; male plates rather long, blunt at the tip, slightly exceeded by the anal plate.

COLOR: Grass green; fore and middle tibiæ and apical segment of the labium suffused with scarlet red; tip of the labium and of the tarsal claws only, black.

Length, apex of vertex to apex of abdomen 11.00-12.00 mm.; tip of wing 14.00-15.00 mm.; wing expanse 24-25 mm.

Holotype ♀. Southern Pines, North Carolina. A. H. Manee.
Allotype ♂. Southern Pines, North Carolina. A. H. Manee.

Scolops parvulus n. sp.

Fig. 186

This species may be recognized by its small size and by the stout gradually tapering cephalic process.

Disk of the vertex broad, well rounded, being much broader than in any other species known to me; cephalic process broad, stout, intermediate in shape between the processes of sulcipes and grossus; general form broad and oval, wing veins sharp and distinct.

COLOR: General color fuscous, with the eyes, lateral areas of the pronotum, tips of the wings, the tibiæ and the tarsi blackish.

Length, eyes to tip of the abdomen 3.50 mm.; cephalic process 2.40 mm.

Holotype ♂. Southern Pines, N. C., June 14, 1918. A. H. Manee.

Paratype ♀. Southern Pines, N. C., June 14, 1918. A. H. Manee.

Epiptera brittoni n. sp.

Fig. 263

This species may be recognized by its dark brown color, narrow produced vertex which is transversely rounded before.

Vertex elongate, narrow, the lateral margins a little arched and the anterior margin broadly transversely rounded; frons narrow, the lateral margins strongly elevated; clypeus strongly carinate; pronotum obtusely produced between the eyes; mesonotal carinæ nearly obsolete.

COLOR: General color dark brown somewhat intermediate between the black species like opaca and the brown species like variegata; vertex, pro- and mesonotum irregularly marked with ochraceous tawny; base of the frons black; apex pale ochraceous buff; clypeus

black, the lighter band continued indefinitely across the genæ, the narrow ventral margin of the breast plates, pro- and mesopleura; the breast plates deep dorsally; legs and abdomen dark brown, the segments of the latter narrowly bordered with paler.

Length, apex of head to apex of abdomen 6.50-7.00 mm.; tips of wings 8.00-9.00 mm.

Holotype ♂. Black Mountain, N. C., Sept. 12, 1912.

Allotype ♀. West Point, N. Y., Sept. 15, 1912. In the collection of W. T. Davis.

Paratypes 1 ♂. Portland, Conn., Aug. 15, 1913. B. H. Walden.

I take pleasure in dedicating this pretty little species to Dr. W. E. Britton, State Entomologist of Connecticut, who has sent me many interesting *Fulgoridæ*.

Catonia carolina n. sp.

This species may be recognized by its rather large size, dark color with the frons unbanded but marked with two short ivory white transverse bars.

Vertex produced, obtusely angulate anteriorly; the median carina faint, the lateral margins strongly elevated; the frons narrow between the eyes; lateral margins nearly straight to near the apex where they are slightly narrowed to the broad clypeus; pronotum short, carinæ well elevated; mesonotal carinæ distinct; veins of the fore wings strongly punctate.

COLOR: General color blackish fuscous; the carinæ of the vertex, pro- and mesonotum paler; frons brownish fuscous, laterally alternate with black and white spots; a short transverse bar at the middle and another at the apex ivory white; ocellated spots on the mesonotum reduced to small pale spots; wings blackish fuscous, more or less variegated with whitish; veins in the wings irregular; longitudinal and cross veins at the apex narrowly white; venter and legs brownish fuscous; abdomen mostly blackish fuscous.

Length, apex of head to apex of abdomen 4.60 mm.; to the apex of the wings 5.90 mm.

Holotype ♀. Swannanoa, N. C., Aug. 8, 1919. H. Osborn and Z. P. Metcalf.

Allotype ♂. Vienna, Va., Aug. 1918.

Paratypes 4 ♀. Plummer's Island, Maryland. O. Heidemann. In the collection of Cornell University. 1 ♂ Vienna, Va., Aug. 1918.

Catonia luella n. sp.

This species may be recognized by its small size, blackish color, veins of the wings impunctate, the cells with numerous small round pale spots.

Vertex narrow, rounded before, the carinæ strongly elevated; frons broad, not distinctly narrowed between the eyes; clypeus broad, shallowly inserted in the frons; pronotum rather elongate, the carinæ strongly elevated, the links of the lateral chain distinct; mesonotum tricarinate; the lateral carinæ but slightly divergent; fore wings with the veins impunctate.

COLOR: General color blackish fuscous; frons nearly unicolorous; the lateral carinæ a little paler; eyes black; mesonotum blackish fuscous, with two indistinct ocellated spots on the anterior margin, two on the posterior margin; fore wings blackish fuscous, the veins blackish, some of the cross veins at the apex narrowly pale; all of the cells with numerous pale round spots; venter and legs blackish, the latter more or less marked with pale.

Length, apex of head to apex of abdomen 3.00 mm.; to the apex of the wings 3.70 mm.

Holotype ♂. Upper Natacumbe Key, Florida. March. In the collection of the Museum of Comparative Zoology.

Allotype ♀. Paradise Key, Florida.

Paratypes 1 ♂, 4 ♀. Paradise Key, Florida. February.

Catonia pini n. sp.

This species may be recognized by its large size, uniform mesonotum, strongly variegated wings, the frons brownish with a narrow pale transverse band.

Vertex produced, obtusely rounded anteriorly; frons narrow at the base, widened apically, the lateral margins a little arcuate; median carina faint, lateral margins strongly elevated; wings strongly punctate.

COLOR: General color pale, more or less variegated with brownish and blackish fuscous; vertex, pro- and mesonotum uniformly ochraceous brown; frons ochraceous brown, the lateral margins alternate with black and ivory white, the narrow transverse band ivory white, basal third of the clypeus ivory white, the apex brownish; wings largely pale ochraceous yellow, irregularly variegated with brownish and blackish fuscous; venter and legs mostly ochraceous brown.

Length, apex of head to apex of abdomen 4.70 mm.; to the tips of wings 6.20 mm.

Holotype ♂. Southern Pines, N. C., August 10, 1917. A. H. Manee.

Allotype ♀. Southern Pines, N. C., late August, 1917. A. H. Manee.

Paratypes 2 ♂ ♂. Southern Pines, N. C., June, 1909. Z. P. Metcalf.

Catonia lunata n. sp.

This species may be recognized by its small size, blackish color and broad strongly produced vertex with the frons brown with a broad transverse pale band in the middle and a shorter pale bar at the apex.

Vertex strongly produced but little narrowed anteriorly; frons broad, not much narrowed at the base or at the apex; wings strongly punctate.

COLOR: General color blackish; vertex pale yellow, with two elongate dashes next the inner margins of the eyes and two near the median carina anteriorly; frons brown, the lateral margins alternate with black and ivory white, the transverse band broad ivory white, a small ivory white bar along the clypeal margin; clypeus mostly pale; pronotum with the carinæ broadly pale, leaving small blackish spots in the compartments; mesonotum blackish, with the carinæ pale and a few small tawny spots; fore wings blackish fuscous variegated with ivory white; venter largely tawny yellow, legs brownish fuscous; abdomen blackish.

Length, apex of head to apex of vertex 4.00 mm.; to the apex of the wings 4.30 mm.

Holotype ♀. Swannanoa, N. C., August 29, 1919. H. Osborn and Z. P. Metcalf.

Allotype ♂. Paradise Keys, Florida.

Paratypes 1 ♀. Paradise Keys, Florida. February. In the collection of the Museum of Comparative Zoology. 1 ♀, Tyngsboro, Mass. 1 ♀, Bay Shore, Long Island. In the collection of Mr. C. E. Olsen.

Bothriocera drakei n. sp.

Figs. 81, 585

This species may be recognized by its pale yellowish testaceous color with the fore wings heavily and irregularly spotted with fuscous, the apex of the wings being strongly infuscated.

Vertex strongly produced; lateral margins of the frons strongly produced; clypeus very long. Pronotum not deeply notched posteriorly. Mesonotum tricarinate. Male pygofer narrow, ventral tooth rather long, genital styles short, narrow at the base, broad and rounded at the apex.

COLOR: General color pale yellowish testaceous; the mesonotum brownish fuscous; fore wings pale whitish testaceous, heavily marked with fuscous, two small fuscous spots at the base, a fuscous band anterior to the stigma, narrowly separated from the stigmatal band; apical portion of the wings crossed by two irregular bands beyond the stigma, the apical border of the wing broadly infuscated; legs testaceous yellow, except the tips of the tarsi which are black; abdomen ochraceous orange; pygofer of the male testaceous yellow.

Length, apex of head to apex of abdomen 2.45 mm.; to the tips of the wings 4.00 mm.

Holotype ♂. Gainesville, Florida. July 4, 1918. C. J. Drake.
Allotype ♀. Gainesville, Florida. July 7, 1918. C. J. Drake.

This species may be merely a darker color variety of *Bothriocera undata* Fabricius but the male genitalia seem to be quite distinct and as stated before it would require a much larger collection of these insects to be sure of their specific distinctions.

Oliarus montanus n. sp.

Figs. 269, 566

This species may be recognized by its broad vertex, finely punctate wing veins and distinct male genitalia.

Vertex broad, narrowed anteriorly, deeply notched posteriorly; frons longer than broad; the clypeus shorter than the frons, much more deeply inserted. Pronotum rather long, the posterior margin triangularly emarginate, the sides nearly straight. Mesonotum with five carinæ distinct, the intermediate carinæ broadly arched. Male pygofer short, broad, the ventral sinus broad, median tooth broadly expanded apically, the apical border but little reflexed, genital styles

slender, broadly curved, the apical portion but little widened; the inner margins short, not contiguous, the outer angles but little produced; the anal segment hood-like, rounded on the apex, which is strongly deflexed, almost touching the apex of the median tooth.

COLOR: General color blackish fuscous, the wings strongly infuscated, veins darker, finely punctate; frons blackish fuscous, the carinæ but little paler; clypeus rufo-fuscous; carinæ distinctly paler; venter and femora fuscous, with tibia testaceous brown, with fuscous rings; abdomen black, the segments narrowly bordered with pale yellow, male genital pieces brown.

Length, apex of head to apex of abdomen 5.00 mm.; to the tip of the wings 7.20 mm.

Holotype ♂. Black Mountains, N. C.
Allotype ♀. Herndon, Virginia.
Paratype 1 ♂. Craggy Mountains, N. C., and 1 ♂, Makanda,

Oliarus vitreus n. sp.

Fig. 574

This species may be recognized by its large size, glossy blackish color and distinct male genitalia.

Vertex narrow, triangularly narrowed anteriorly; frons narrow between the eyes, broader below; pronotum deeply notched posteriorly; mesonotum with five distinct carinæ; fore wings uniformly punctate; male pygofer with a long median tooth, genital styles slender with a distinct elevated ridge, their apices much reflexed appearing coiled.

COLOR: General color dark, glossy; head, thorax and abdomen black, clypeus not distinctly paler than the frons; legs uniform dark tawny; fore wings glossy much infuscated and marked with blackish. there is usually a broad distinct transverse band from the middle of the costal margin diagonally across the wings to near the apex of the clavus, this band nearly paralleling the lateral borders of the mesonotum.

Length, male, apex of head to apex of abdomen 6.00 mm.; tips of wings 8.00 mm.; female, apex of head to apex of abdomen 7.00 mm.; tips of wings 9.00 mm.

Holotype ♂. Southern Pines, N. C. May 29, A. H. Manee.
Allotype ♀. Southern Pines, N. C. May 29, A. H. Manee.
Paratype 1 ♀. Southern Pines, N. C. June 4, A. H. Manee.

Oliarus texanus n. sp.

Figs. 275, 572

This species may be recognized by its small size, broad form, narrow vertex which is deeply notched posteriorly and distinct male genitalia.

Vertex narrow, triangular before, posterior border deeply emarginate; frons very narrow at the base, broad at the apex, the side margins nearly straight; clypeus shorter than the frons. Mesonotum distinctly five carinae; pygofer of the male rather slender, the ventral tooth broad at the base, suddenly constricted apically; the genital styles broadly excavated at the base, nearly touching in the middle line apically, the apical portion reflexed and produced into an acute tooth laterally, the anal segment broad, hood like, almost enclosing the tips of the genital styles.

COLOR: General color blackish fuscous; the eyes brown, vertex and disk of the mesonotum, the clypeus of the female brownish fuscous; wings a little smoky with veins fuscous apically; all the veins strongly punctate; legs testaceous yellow, the coxæ and femora blackish fuscous.

Length, male, apex of head to apex of abdomen 2.60 mm.; to the tips of the wings 3.85 mm. Female, apex of head to apex of abdomen 4.20 mm.; to the apex of the wings 4.90 mm.

Holotype ♂. Brownsville, Texas. November 21, 1911.

Allotype ♀. Brownsville, Texas. November 21, 1911.

Paratypes. Brownsville, Texas. November 19, one ♂, December 9, one ♂ and November 23, one ♀.

Oliarus vittatus n. sp.

Figs. 74, 276, 573

This species may be recognized by its small size, narrow vertex with the genital styles of the male about as long as the ventral sinus.

Vertex narrow, elongate, the sides nearly parallel; frons much narrowed between the eyes, about half as wide at the base as at the apex; mesonotum quinquecarinate; the intermediate carinæ rather faint; wings strongly and uniformly punctate; male pygofer with median tooth simple; triangular, the ventral sinus deep; the genital styles rather broad at the base, constricted near the apex, the inner and outer angles about equally produced.

COLOR: General color tawny; the eyes and the lateral margins of the mesonotum blackish; frons and venter largely fuscous; the legs pale yellow. The female that I associate with this species has the claval area of the wings fuscous and a broad vitta at the apex fuscous.

Length, apex of head to apex of abdomen 3.50 mm.; to tips of the wings 5.80 mm.

Holotype ♂. Brownsville, Texas. November 19, 1911. In the collection of the Illinois State Laboratory of Natural History.

Allotype ♀. Brownsville, Texas. December 8, 1911.

Cixius apicalis n. sp.

Figs. 78, 284, 285, 578

This species may be recognized by the fact that the wings are broadly fuscous to near the apex of the clavus with the apex milky subhyaline, thickly spotted with fuscous and by the distinct genitalia.

Vertex crescent-shaped transverse, broadly rounded before, not reaching the frons; frons longer than the clypeus, strongly narrowed between the eyes; lateral carinæ of the mesonotum strongly diverging; pygofer of the male short, ventral tooth elongate, acute, genital styles narrow at the base, widely separated, meeting apically, their apices broadly expanded and reflexed, reaching the anal segment; anal segment narrow, not produced.

COLOR: General color of the body blackish fuscous; carinæ of the frons and posterior margin of the pronotum yellowish testaceous; fore wings blackish fuscous on the basal half with clavus darker, almost black on the costal margin, paler and brownish internally; the apical portion of the wings milky subhyaline, more or less spotted with fuscous; there are three distinct fuscous spots on the costal margain; the middle one continued as an interrupted fuscous band towards the apex of the clavus, the longitudinal veins with some triangular fuscous spots on the apical margin; basilar angles narrowly pale yellow; legs testaceous yellow; the fore femora fuscous; abdomen fuscous; the apex of the genitalia testaceous yellow.

Length, apex of head to apex of abdomen 3.50 mm.; to tips of wings 5.25 mm.

Holotype ♂. New Haven, Conn. June 25, 1921. B. H. Walden.

Allotype ♀. Ithaca, N. Y. June 8, 1895.

I believe that this is the species that has been identified in the past as *Cixius albocinctus* Germar, the Paleartic species given as a variety of *Cixius pilosus* by Oshanin; but it seems to be distinct from specimens in my collection identified as *Cixius albocinctus* Germar and *Cixius pilosus* by Lethierry.

Ciocixius New Genus.

Orthotype *Cixius dorsivittatus* Van Duzee.

This genus may be recognized by the broad vertex and by the nearly perpendicular wings which are broadened apically and strongly compressed.

Head nearly as broad as the pronotum; vertex squarely produced for more than half its length in front of the eyes; lateral compartments of the genæ evident dorsally; frons nearly vertical, median carina distinct, lateral margins strongly reflexed, regularly arcuate from base to apex; pronotum short, collar-like, the anterior and posterior margins nearly concentric; disk of the mesonotum tricarinate, strongly elevated, the lateral compartments nearly vertical; fore wings vertical, strongly broadened apically; subcosta and radius united at the base for a short distance only, cubitus forked at about the same level as the union of the claval veins; posterior tibia armed with two small spines, one on the basal half and the other near the middle.

Microledrida flava n. sp.

Figs. 76, 280, 281, 576

This species may be recognized by its pale yellow color, practically unmarked wings and distinct male genitalia.

Vertex broad, not produced for more than one-third of its length in front of the eyes; median carina strongly elevated throughout; frons broad, not more than one and one-half times as broad as long; median carina distinct; pronotum not half as long as the vertex; mesonotum nearly twice as long as the vertex; median tooth of the male pygofer short and obtuse; genital styles not widely separated, their inner angles meeting on the median line; outer angles only slightly produced, obtuse.

COLOR: General color pale testaceous yellow, eyes brown; clypeus shading to ochraceous orange; wings milky subhyaline; the punctures

testaceous yellow with an indistinct fuscous spot at the apex of subcosta, otherwise wings are unmarked; legs pale ochraceous yellow, spines and claws tipped with black; abdomen pale ochraceous yellow.

Length, apex of head to apex of abdomen 2.50 mm.; to the tips of the wings 3.25 mm.

Holotype 1 ♂. Brownsville, Texas. November 21, 1911. In the collection of the Illinois State Laboratory Natural History.

Oecleus productus n. sp.

Figs. 298, 588

This species may be recognized by its small size, general pale yellow color with the anal segments of the male strongly produced.

Vertex much narrowed posteriorly, lateral margins almost touching, much produced in front of the eyes; frons rather broad at the apex, suddenly constricted at about the middle of the eyes; median carina distinct; pronotum short, the posterior border strongly reflexed, rather deeply notched; mesonotum quinquecarinate; median tooth of the male pygofer short but tongue-like; genital styles rather short; the anal segments strongly produced, narrowed apically.

COLOR: General color pale ochraceous orange or ochraceous yellow; frons and clypeus black between the carinæ; genæ black, the eyes and antennæ paler; vertex black and the carinæ paler; pronotum mostly pale but a little clouded with blackish; mesonotum ochraceous orange, somewhat clouded between the carinæ; wings yellowish; veins on the base concolorous, fuscous at the apex; abdomen blackish, the segments narrowly bordered with yellow apically.

Length, apex of head to apex of abdomen 2.50 mm.; to the apex of wings 4.20 mm.

Holotype ♂. Dongola, Illinois. August 23, 1916.

Paratypes 2 ♂. Metropolis, Illinois. August 19 and 20, 1916. 1 ♂, Phoenix, Ariz., June 8, 1902.

Myndus truncatus n. sp.

Figs. 312, 600

This species may be recognized by its twice banded frons and truncate genital styles.

Vertex long, narrow, the lateral margins converging to the middle of the eyes then nearly parallel to the front; frons very short and

broad below; pronotum short, deeply sinuate; mesonotum long, lateral carinæ strongly diverging; median tooth elongate, obtuse; genital styles long, meeting on the median line for about half their length, their apices slightly broadened, obliquely truncate.

COLOR: General color ochraceous yellow; apex of the vertex marked with blackish fuscous; frons and clypeus ochraceous buff, the former with a broad basal band and a narrow apical band of black; mesonotum ochraceous orange, the intermediate compartments clouded with blackish fuscous; wings milky subhyaline, the veins heavily brown, the apical margin narrowly fuscous.

Length, apex of head to apex of abdomen 4.20 mm.; to the tips of the wings 5.25 mm.

Holotype ♂. Elizabeth, Ill. July 6, 1917. In the collection Illinois State Laboratory of Natural History.

Bruchomorpha vittata n. sp.

Figs. 55, 220

This species may be recognized by its elongate narrow front, short nearly truncate nasal process.

Vertex rather broad, the lateral margins converging to the intermediate carinæ, the anterior margin nearly straight; frons rather elongate, narrow; the intermediate carinæ slightly arched, the nasal process short, but little produced, nearly truncate anteriorly. Pronotum broadly rounded anteriorly, deeply almost triangularly emarginate posteriorly. Mesonotum ecarinate, the disk broadly arched, the scutellar portion flat, produced. Macropterous wings narrow, elongate.

COLOR: General color dull blackish fuscous; eyes grayish brown; median frontal stripe evident, extending to the posterior border of the pronotum. Mesonotum and abdomen paler, median stripe narrower. Macropterous wings smoky hyaline; legs pale yellowish testaceous; all the femora and fore tibiæ washed with brownish fuscous.

Length, macropterous form, apex of head to apex of abdomen 3 mm.; apex of wings 4.20 mm.

Holotype ♀. Brownsville, Texas. November 21, 1911. In the collection of the Illinois State Laboratory Natural History.

Paratypes 2 ♀ ♀. Brownsville, Texas. November 21, 1911.

Bruchomorpha rugosa n. sp.

Figs. 56, 222

This species may be recognized by its general pale testaceous color with the brachypterous wings strongly rugose, the nasal process narrowly produced.

Vertex almost triangular, strongly produced anteriorly; frons narrow, elongate, the intermediate carina broadly arched enclosing a nearly oval area, nasal process distinctly produced, not deeply sinuate ventrally. Pronotum elongate, broadly arched anteriorly, nearly straight posteriorly. Mesonotum rather short, tricarinate, the lateral carinæ converging with two impressed points on the posterior half of the disk; wings coarsely rugose; legs stout.

COLOR: General color testaceous yellow, more or less marked with black; intermediate carinæ of the frons narrowly bordered by black internally; lateral compartments of the frons black; the apex of the nasal process broadly black; genæ chiefly black; abdomen with a series of six short dashes on each side of the segments; legs testaceous yellow; heavily marked with black; fore and middle femora twice-ringed with black; all the tibiæ broadly black apically; tarsi blackish fuscous.

Length, apex of head to apex of abdomen 3 mm.

Holotype ♀. Brownsville, Texas, September.

Paratype 1 ♀. Nogales, Arizona, September 24.

This special somewhat suggests *Aphelonema rugosa* Ball but it is an evident *Bruchomorpha* with strongly produced front and short vertex.

Bruchomorpha bicolor n. sp.

Figs. 30, 224

This species may be recognized by its shortly produced nasal process, elongate frons, general pale yellow color with two broad black stripes extending from the apex of the nasal process across the eyes to the apex of the abdomen.

Vertex short, the anterior margin broad, nearly straight; frons elongate, the intermediate carina broadly arched basally then converging straight to the apex of the frons; nasal process elongate, bluntly triangular, the ventral margin not sinuate. Pronotum broadly

rounding anteriorly, broadly sinuate posteriorly, about half as long as the mesonotum; disk of the mesonotum broad, the lateral carinæ evident, the intermediate carina faint; male genital styles broad at the base, gradually narrowed apically, the apex produced, short triangular teeth directed anteriorly.

COLOR: General color pale dull yellow, a broad blackish fuscous stripe on each side of the body extending from the apex of the nasal process across the compound eyes, the disk of the wings and then converging to the apex of the abdomen; meta-pleura black, a narrow black stripe on the lateral ventral margins of the abdomen, spines and claws of the legs black; genitalia black.

Length of male, 2 mm.; of the female 3 mm.

Holotype ♂. Brownsville, Texas, November 21, 1911.

Allotype ♀. Brownsville, Texas, November 21, 1911.

Paratypes 5 ♀ ♀. Brownsville, Texas, November 21, 1911.

Bruchomorpha minima n. sp.

Fig. 213

This species may be recognized by its uniform black color, small size and narrow frons.

Vertex narrow, the anterior border broadly sinuate, median carina of the vertex strongly elevated; median carina of the frons strongly elevated, the intermediate carine strongly arched basally, gradually converging anteriorly; nasal process not produced, broadly rounded anteriorly; anterior border of the pronotum broadly rounded, the posterior border narrowly and shallowly sinuate. Mesonotum but little longer than pronotum, none of the carinæ strongly elevated; wings coarsely rugose.

COLOR: General color almost uniform shining black; the posterior tarsi a little rusty.

Length, apex of head to apex of abdomen 1.90 mm.

Holotype ♂. Southern Pines, North Carolina. Late June, A. H. Manee.

Paratypes 2 ♂ ♂. Southern Pines, N. C. Late June, A. H. Manee.

This is the smallest species known to me. It is very close to *B. tristis* Stal but seems to be distinct.

Bruchomorpha decorata n. sp.

Figs. 57, 223

This species may be recognized by its very short nasal process, nearly vertical frons and strongly contrasted colors.

Vertex short, strongly sinuate on the anterior margins, nasal process not produced, broadly rounded anteriorly; frons more nearly vertical than in any other species of the genus; frons broad about one and one-half times as long as broad; the intermediate carina broadly arched; pronotum produced anteriorly, posterior margin broadly sinuate with a distinct median notch. Mesonotum short and broad, about twice as long as the pronotum; tricarinate, the lateral carinæ strongly elevated; wing coarsely reticulate; male genitalia broad at the base, gradually narrowed to the acute apices, the inner margins nearly parallel, the apices a little curved anteriorly.

COLOR: General color ochraceous orange, heavily and irregularly marked with black; frons ochraceous orange, the lateral compartments irregularly marked with black; genæ black. Pronotum ochraceous orange, with a row of heavy black spots anteriorly. Mesonotum varying from ochraceous orange with a few black spots to black with a few ochraceous orange spots; wings with the veins mostly pale, the cells irregularly clouded with fuscous or black; legs blackish fuscous or brownish fuscous; dorsal portion of the abdomen ochraceous buff or ochraceous orange varied with blackish; venter of the abdomen black.

Length of the male 2.25 mm.; of the female 2.75 mm.

Holotype ♂. Brownsville, Texas, November 21, 1911.

Allotype ♀. Brownsville, Texas, November 21, 1911.

Paratype 1 ♀. Brownsville, Texas, November 21, 1911.

Aphelonema rosa n. sp.

Figs. 2, 226, 227

This species may be recognized by its small size, narrow vertex, general reddish color and short obtuse genital styles of the male.

Vertex short, about six times as broad as long; frons short and broad, the intermediate carinæ strongly arched, pustules inconspicuous; clypeus with an evident median carina. Pronotum with the anterior margin strongly curved laterally, the posterior margin almost

straight, median carinæ evident, the disk without pustules. Mesonotum short, the disk broad; lateral compartments pustulate. Brachypterous wings truncate posteriorly, nearly reaching the third segment; genital styles of the male broad, rather obtuse, the inner margins nearly contiguous for the entire length; the apices acute, directed anteriorly.

COLOR: General color pale dull red, the legs, vertex, dorsal part of the frons, the pro- and mesonotum salmon orange; eyes black.

Length, apex of head to apex of abdomen 2.25 mm.

Holotype 1 ♂. Cape Charles, Virginia, September 1, 1920. D. M. DeLong.

Paratype 3 ♂. Cape Charles, Virginia, September 1, 1920. D. M. DeLong.

Paratype 1 ♂. Pascagoula, Miss., August 6, 1921. H. L. D.

Traxus New Genus.

Orthotype *Traxus fulvus* n. sp.

This genus is close to *Hysteropterum* Amyot and Serville but it may be recognized by its general rugose appearance, triangularly incised vertex, narrowly parallel-sided concave frons.

Vertex short, about four times as broad as its median length; anterior margin deeply incised, the lateral margins nearly one and one-half times as long as the median length; frons narrow, tricarinate, nearly parallel-sided, the margins finely crenulate; clypeus small, reflexed; antennæ short, second segment globular; pronotum about twice as long as the vertex, strongly produced anteriorly; mesonotum about as long as the pronotum, tricarinate; the lateral carinæ strongly elevated and tuberculate; fore wings rugulose and reticulate, the corium broadly expanded and the clavus elevated; no submarginal veins; posterior tibiæ with strong spine at the middle, and another near the apex.

Traxus fulvus n. sp.

Figs. 62, 238, 239, 532, 474

This species may be recognized by its general ochraceous orange color with the clypeus and coxæ black.

Frons concave deeply emarginate dorsally, the carinæ very irregular the lateral margins nearly parallel crenulate, suddenly constricted

to the small clypeus; pronotum with an evident median carina and two impressed points either side; mesonotum tricarinate, the median carina faint, the lateral carinæ elevated into elongate tubercules; wings rather narrow, the apical margins obliquely rounded.

COLOR: General color dull ochraceous orange sometimes clouded with blackish; eyes black, the lateral margins of the frons alternate black and white; clypeus, coxæ, fore and middle femora black, irrorate with paler; wings concolorous, the veins a little paler.

Length, male, apex of head to apex of abdomen 4 mm.; female, 5.50 mm.

Holotype ♂. Brownsville, Texas, August 8, 1906. A. B. Wolcott.

Allotype ♀. Brownsville, Texas, November 26, 1910. In the collection of Illinois State Laboratory Natural History.

Paratypes 1♀. November 24, 1911. 1♀, November 21, 1911. 1♀, November 26, 1919. All collected at Brownsville, Texas.

Thionia quinquata n. sp.

Fig. 255

This species may be recognized by its narrow five angled vertex and nearly uniform brown color which is almost uniformly covered with small dark points.

Vertex narrow, a little longer than broad, the lateral margins diverging, the anterior margin strongly produced; frons narrow tricarinate, the lateral margins a little arched; pronotum strongly produced between the eyes; mesonotum long with an evident transverse carinæ; fore wings with the longitudinal and transverse veins evident.

COLOR: General color ochraceous brown with the whole surface of the body including the wings and legs uniformly sprinkled with small black points, veins of the wings and claws black.

Length to tips of the wings 8.00 mm.

Holotype ♀. Raleigh, N. C. Early September. C. S. Brimley.

Acanalonia fasciata n. sp.

Figs. 127, 558

This species bears a general resemblance to *Acanalonia bivittata* Say but it may be recognized by its small size, pale legs and frons, and different genitalia.

Head broad, slightly broader than the prothorax; vertex broad, tricarinate; lateral margins strongly diverging; posterior margin broadly curved; anterior margin curving gradually into the frons. Frons very broad, nearly twice as broad as long. Pronotum elongate; anterior margin produced; posterior margin broadly triangularly notched. Mesonotum elongate without carina. Fore wings elongate, about twice longer than broad, longitudinal veins distinct; reticulating veins rather indistinct on the basal half. Last ventral segment of the female broadly excavated without median tooth.

COLOR: General color testaceous (green in life?) with the broad brownish fascia extending from the compound eyes across the lateral field of the pro- and mesonotum and gradually attenuated along the sutural margins of the elytra. Frons, clypeus and all of the legs testaceous. Last ventral segment of the female broadly excavated to almost its anterior border.

Length, apex of head to apex of abdomen 5.25 mm.; to apex of wing 7.35 mm.; length of wing 5.07 mm.; greatest width of wing 2.62 mm.

This species might readily be mistaken for a depauperate form of *Acanalonia bivittata* but the coloring is somewhat different and the genitalia totally unlike.

Holotype ♀. Brownsville, Texas.
Allotype ♂. Nogales, Arizona.
Paratypes 1 ♀, 1 ♂. Nogales, Arizona. September.

Flatoides maculosus n. sp.

Figs. 17, 145

This species may be recognized by its short, broad vertex, pale ochraceous buff or olive ochraceous buff color, heavily spotted with fuscous and by the very distinct genitalia.

Head broad; vertex nearly twice broader than long angularly produced anteriorly; frons somewhat elongate, conically produced basally; clypeus about one and one-half times as long as broad; clypeal grooves evident; antennæ with second segments about one and one-half times as long as first segment, both segments somewhat flattened. Pronotum broad, short, nearly four times as broad as long. Mesonotum strongly produced anteriorly; costal margins of the wing faintly crenulate; costal membrane about twice as broad as the costal

cell; the transverse veins slightly reticulate; humeral angles not much produced; hind tibia with three spines; the basilar one small; female genitalia with last and penultimate segments deeply almost squarely excavated; pygofers large, broadly curved on the inner margins; marginal teeth very fine and numerous; anal segment broad, triangular, barely exceeding the pygofers; last ventral segment of the male broader than long, roundly excavated apically; pygofers narrow, about two and one-half times as long as broad, longer than the last ventral segment, broadly separated at the base, approximate subapically, their apices bluntly rounded.

COLOR: General color in the female pale ochraceous buff, heavily flecked with blackish fuscous; in the male the general color is more olive; head unmarked except for two blackish dashes in front of the eyes and three black spots on the second joint of the antennæ. Pronotum with two impressed points near the anterior border and a blackish cloud behind the eye. Mesonotum with three blackish spots along each posterior border, the central one very large and a pair of spots medianly near the anterior border; wings heavily marked with irregular blackish fuscous spots. There is usually a row of very irregular spots along the costal border which become small triangular spots around the apical margin. The corium is marked with numerous large and small spots and the last subapical line is irregularly bordered with fuscous externally; the clavus has a large spot near the base and a row of short dashes along the sutural margin.

Length, female, apex of head to apex of abdomen 7.50 mm.; to apex of wing 10.40 mm.; male, apex of head to apex of abdomen 6.30 mm.; to apex of wing 9.20 mm.

This species might be confused with pale specimen of *Flatoides punctatus* Walker but they are much more heavily spotted and their genitalia are entirely different.

Holotype ♀. Paradise Key, Florida. In the collection of the U. S. National Museum.

Allotype ♂. Marco, Florida.

Flatoides concisus n. sp.

Fig. 150

This species may be recognized by its small size, pale color and short transverse vertex.

Head broad, nearly as broad as the disk of the pronotum; vertex short, about one and one-half times as broad as long; anterior margin nearly right angled; frons longer than broad, bluntly produced basally; clypeus broad, flat, clypeal grooves indistinct, antennæ with second joint nearly three times as long as first, truncate apically. Pronotum short, produced anteriorly to the anterior margins of the eyes, triangularly notched posteriorly. Mesonotum small, flat, wings elongate narrow, costal membrane about twice as wide as the costal cell, costal margin straight; two subapical lines rather irregular; hind tibia with two spines on the apical third; last ventral segment of the female triangularly notched; penultimate deeply notched with the side margins converging slightly; pygofers short, broader than long, the apical margins broadly rounded with heavy teeth; anal segment short, transverse, exceeded by the pygofers.

COLOR: General color pale ochraceous buff, heavily sprinkled with a whitish powder, a few blackish fuscous markings; vertex fuscous with the median lines and lateral margins paler; frons and clypeus ochraceous buff; pronotum with two impressed points and a blackish cloud behind the eyes. Mesonotum brownish fuscous clouded with blackish anteriorly; fore wings ochraceous buff, veins nearly concolorous. There is a broad irregular blackish fuscous band from the costal margin across the humeri to the middle of the clavus, another one at the apex of the clavus extends on to the corium, another diagonal band at the apex of the costal membrane and a few irregular fuscous clouds in the cells of the membrane, apical spots very faint; venter and legs ochraceous buff, excepting the mesopleura, genital pieces, spines and claws of the legs which are marked with fuscous.

Length, apex of head to apex of abdomen 6.60 mm.; to tip of wing 9.10 mm.

Holotype ♀. Florida.

This is a very small pale species which is closely related to *Flatoides acutus* Uhler. The genitalia seem to be sufficiently distinct and the color is entirely distinct.

Neocenchrea New Genus.

Orthotype *Cenchrea heidemanni* Ball.

This genus is closely related to *Cenchrea* but the vertex is narrower, more produced; the frons is narrower, the side margins more elevated; the wings are elongate with distinct venation.

Head narrow; vertex about twice as long as broad, strongly produced anteriorly; triangularly excavated on the posterior margin, lateral margins strongly elevated and pustulate; anterior margin separated from the frons by a distinct carina; frons narrow, about four times as long as broad on the clypeal margin, the lateral margins nearly parallel above, gradually widened to the border of the clypeus below; the lateral margins strongly elevated; median carina wanting; clypeus strongly inflated broadly inserted into the frons, wider than the frons; lateral border faintly margined; median carina distinct; antennæ short; antennal collar strongly elevated; second segment of the antennæ about four times as long as the first; eyes large, ventral sinus broad and deep; prothorax short, broadly notched posteriorly; the posterior borders strongly elevated; median carina blunt; intermediate carina blunt; lateral carina not as strongly elevated as the ventral margin; antennal chamber very deep. Mesonotum nearly as long as broad, strongly inflated anteriorly, tricarinate; all the carinæ faint; wings long and narrow, nearly five times as long as broad; radius separated from subcosta at about the middle of its length; medius two branched, each of these branches forked at a short distance from the apex; cubitus deeply forked; forking nearly the same level as the claval veins; claval veins two, the posterior one coarsely pustulate; legs slender; posterior tibia unarmed; posterior tarsi nearly half as long as the tibia.

Euklastus New Genus.

Fig. 339

Orthotype *Euklastus harti* n. sp.

This genus may be recognized by the peculiar venation of the wings, by the narrow frons and elongate antennæ.

Head narrow, the eyes large, vertex very small, deeply incised posteriorly; produced anteriorly and continued as the narrow rounded frons; frons very narrow produced; clypeus broader slightly inflated, antennæ elongate, first joint very small, second joint flattened, elongate; pronotum short, deeply notched posteriorly, the anterior margin a little produced, median carina evident; mesonotum large, ecarinate; fore wings long, subcosta and radius united to near the apex of the wing; medius with four branches, clavus narrow, open, the common stem of claval veins extending to first cubitus, hind wings small, costal margin with an appendix, venation reduced; legs slender, hind tibiæ without spines.

Euklastus harti n. sp.

Figs. 23, 334, 335, 336, 520, 479

This species may be recognized by its small vertex, pale colors with the wings heavily but sparsely spotted with fuscous.

Vertex consisting chiefly of the carinate lateral borders, posterior margin deeply triangularly emarginate, broadly rounded anteriorly to the frons; frons narrow, keel-like, produced; eyes large, deeply sinuate, the anterior horn strongly produced ventrally; antennal collar strongly elevated; first segment of the antennæ minute, second segment flattened about six times as long as broad, narrow basally, widened apically, the apex obliquely truncate and notched for the bristle; pronotum deeply notched posteriorly, the sides flaring; fore wings elongate, spatulate.

COLOR: General color pale tawny yellow, eyes black, fore wings milky subhyaline, veins yellow with a few spots of tawny, and a few rosy red spots at the apex of the costal cell on the costal cross veins, the tawny spots are arranged as follows, a small one at the base, a narrow one about one-third the length of the wing from the base extends from the costal margin to the cubital veins, two small transverse ones beyond this in the costal cell, a narrow cloud on the radio-medial cross veins, a broad cloud on the cell subcosta one, a large spot on the first and second medius, the veins at the apex of the wing with small spots and the small quadrangular cells of the costal margin clouded with tawny; legs and abdomen pale tawny yellow.

Length, apex of head to apex of abdomen 2.10 mm.; to tips of fore wings 6.30 mm.

Holotype ♂. Alto Pass, Illinois. C. A. Hart, August 13, 1891.

This delicate little species is named in honor of the late Mr. C. A. Hart who labored so industriously collecting and arranging the Illinois *Fulgoridæ*.

Herpis incisa n. sp.

Figs. 619, 486

This is a small blackish species with distinct male plate.

Vertex twice broader than long. Frons broad, short, scarcely two and one-half times as long as broad, only slightly narrowed between the eyes: lateral margins slightly elevated with faint central carinæ.

Clypeus elongate, longer than the frons with distinct lateral and central carinæ. Compound eyes with ventral sinus rather deep. Pronotum narrow, deeply and broadly notched posteriorly; breast plates rather small; three mesonotal carinæ rather sharp; subcostal cell about twice as long as broad. Male plates with the inner margins with a distinct notch on basal half, apical tooth very blunt and short.

COLOR: General color blackish fuscous; beak and legs ochraceous buff with the tip of the former and the tarsi spotted with blackish. Fore wings blackish fuscous, veins darker, covered in fresh specimens with dark bluish powder. Hind wings smoky, subhyaline; veins blackish.

Length, apex of head to apex of abdomen 1.75 mm.; to apex of wings 3.15 mm.; width of pronotum .98 mm.; wings expanse 8.40 mm.

Holotype ♂. New Haven, Conn., July 2, 1920. B. H. Walden.

Allotype ♀. North Branford, Conn., July 2, 1920. B. H. Walden. On *Salix*.

Herpis australis n. sp.

Fig. 620

This is a medium large, blackish fuscous species with light yellow venter and legs; and distinct genitalia.

Vertex nearly twice as wide as long, rounded anteriorly, separated from the frons by a very faint carina; frons nearly three times as long as broad, side margins strongly reflexed but little narrowed between the eyes; clypeus long, nearly as long as the frons; subantennal plate strongly elevated. Pronotum short, deeply excavated, posteriorly. Mesonotum long, weakly tricarinate on the anterior border; wings long and narrow; venation typical. Male plates large, separated about the width of their bases basally, the inner margins converging and nearly meeting in the middle of their length then widely converging apically ending in long sharp recurved spines. This species bears a general resemblance to our northern *Herpis vulgaris* Fitch but it averages somewhat smaller and the genital plates are entirely distinct.

COLOR: General color blackish or brownish fuscous; venter and legs pale yellow, more or less covered with blueish powder; head mostly brownish testaceous; lateral margins of the clypeus and frons bordered by a broad blackish stripe; eyes blackish; genæ and lateral margins of the clypeus blackish fuscous; pronotum yellowish testa-

ceous. Mesonotum blackish; fore wings deep brownish fuscous at the base gradually paler apically, densely covered with brownish powder, veins darker; venter and legs pale yellowish; tips of the tarsi and claws blackish; abdomen brownish fuscous densely covered with brownish powder.

Length, apex of head to apex of abdomen 2.45 mm.; to apex of wing 4.20 mm.; length of wing 3.85 mm.; greatest width of wing 1.40 mm.; width across the tegulæ 1.05 mm.

Holotype ♂. Brownsville, Texas, November 11. In the collection of the Illinois Laboratory of Natural History.

Allotype ♀. Brownsville, Texas, November 24.

Paratypes 2 ♂ ♂. Brownsville, Texas, December.

Stenocranus arundineus n. sp.

Figs. 399, 400, 640, 641, 552

This species may be recognized by its general light orange yellow color without conspicuous black markings except the black eyes and its broad short vertex.

Head narrower than the pronotum; vertex broad about twice as long as broad at the base, the basal margins strongly elevated and weakly triangularly notched; the lateral carinæ meeting before the anterior margin of the compound eyes; median carina wanting; frons about five times as long as broad nearly parallel margined throughout its entire length; clypeus long about two-thirds as long as the frons; antennæ long reaching beyond the clypeal margin with segment two about three times as long as segment one; pronotum about as long as vertex; lateral carinæ strongly convergingly curved; posterior margin weakly excavated between the lateral carinæ; mesonotum about two and one-half times as long as pronotum; lateral carinæ converging; calcar half as long as the basal segment, strongly appressed; male pygofer about as long as broad; genital styles broad at the base, rather suddenly constricted curving outward and then inward with sharp apices nearly touching; anal tube as long as the pygofer with two strong nearly parallel ventral processes which are quite sharply pointed; female pygofers broad and rather flat; ovipositor narrow, well elevated; anal tube short without ventral spines.

COLOR: General color light orange yellow with the frons and the antennæ and two broad stripes just inside the lateral carinæ orange;

between these stripes the pronotum and mesonotum are creamy white, these stripes are faintly indicated along the clavus with the suture margin creamy white; the eyes, the spines on the legs and the claws black.

Length, apex of vertex to apex of abdomen 3.75 mm.; width of pronotum 1.00 mm.; length of vertex .33 mm.

Holotype ♂. Swannanoa, N. C., August 9, 1918. Herbert Osborn and Z. P. Metcalf.

Allotype ♀. Swannanoa, N. C., August 9, 1918. Herbert Osborn and Z. P. Metcalf.

Paratypes 10 ♂ and 10 ♀.

Collected Swannanoa, North Carolina, August 1919 from *Arundinaria* sp.

Megamelanus terminalis n. sp.

Figs. 18, 425, 426, 555, 661

This species may be recognized by the bicolored wings of the brachypterous male, the strongly spatulate vertex and the straight lateral carinæ of the pronotum.

Head as broad as pronotum; vertex flat with the lateral carina meeting at the apex; median carina faint; lateral carinæ of the genæ very strong giving the vertex a broad spatulate appearance; frons about four times as long as broad; antennæ short; second segment about two and one-half times as long as first; pronotum projecting anteriorly to about the middle of the eyes; nearly square anteriorly; weakly sinuate posteriorly; about half as long as the vertex; lateral carinæ broadly separated straight, weakly diverging mesonotum equalling the pronotum; the lateral carinæ straight and more strongly divergent; calcar nearly as long as the basal segment of the tarsi without the apical spines, strongly and uniformly toothed; pygofer of the male rather long, the genital aperture oval; genital styles diverging for about three-fourths of the length with the apical portion incurved, sharply acuminate, meeting in the median line; anal tube with two long curved horn-like processes.

COLOR: General color of the male: head and thorax pale buffy more or less shaded with fuscous; eyes black; legs ochraceous orange faded to buff at the joints with the spines and tarsal claws black. Brachypterous wings with the basal half milky subhyaline allowing

white metanotum to show through; the apical half opaque black; abdominal segments dorsally and ventrally ochraceous orange marked with black along the lateral margins; genital pieces black. Color of the female: eyes, spines of the legs, claws and ovipositors black; lateral margins of the pronotum and the tegulæ dusky; metapleura clouded with black; keolopterous wings long, narrow, faintly yellow the veins white setigerous.

Length, apex of vertex to apex of abdomen, male, 2.25 mm.; female 3.50 mm.; length of vertex, male, .66 mm.; female .66 mm.; width of pronotum, male, .50 mm.; female .66 mm.

Holotype ♂. Carolina Beach, Wilmington, N. C., June 4, 1920.

Allotype ♀. Carolina Beach, Wilmington, N. C., June 4, 1920.

Paratypes 5 ♂. Carolina Beach, Wilmington, N. C., June 1920. Four ♂, Cape Charles, Virginia, July 31, 1920. D. M. DeLong. Ten ♀, Carolina Beach, North Carolina, June 1920. Two ♀, Cape Charles, Virginia, August 1, 1920. D. M. DeLong.

Megamelanus dorsalis n. sp.

Figs. 110, 432, 433, 664

This species may be recognized by its yellowish testaceous head and thorax, and blackish wings and distinct genitalia.

Vertex elongate, narrow, the lateral margins converging slightly to in front of the eyes and then strongly to the acute apex; frons widened apically, strongly narrowed to the apex of the vertex; frons tricarinate; clypeus broad and short, antennæ short; first segment about half as long as the second; second segment globular; eyes subglobular, triangular in outline. Pronotum about half as long as the vertex, deeply notched posteriorly, tricarinate on the disk, the intermediate carina somewhat bowed outwardly; ventral margins of the breast plates convex, strongly reflexed. Mesonotum about as long as the pronotum, tricarinate, the lateral carina strongly converging anteriorly; wings elongate, narrow, opaque. Male pygofer rather short, broader than long; aperture large, the genital styles long, narrow, widened apically; anal segment short, anal processes short incurved, nearly meeting in the intermediate line, anal style short; female pygofers long, narrow, nearly parallel-sided; last and penultimate ventral segment triangularly notched; ovipositor long, reaching to the

apex of the pygofers; anal segment short, broad, nearly four times as broad as long, anal styles heavy about twice as long as the anal segment.

COLOR: General color yellowish white and black as follows: vertex, basal margins of the frons and genæ, pro-and mesonotum yellowish white; apical seven-eights of the frons, clypeus, venter, abdomen and fore wings blackish; legs mostly blackish; fore tibia and middle tibia and tarsi except the apex of the tarsi and claws yellowish whitish; apex of the hind femora, base and apex of the tibia and the hind tarsi yellowish.

Length, apex of head to apex of abdomen 2.25 mm.; to the tip of the wing 2.60 mm.; width across the tegulæ .50.

Holotype ♂. Atlantic City, New Jersey, August 25. W. J. Gerhardt.

Allotype ♀. Atlantic City, New Jersey, August 25. W. J. Gerhardt.

Paratype ♂. Pascagoula, Miss., August 6, 1921. H. L. Dozier.

Megamelanus lautus n. sp.

Figs. 38, 427, 428, 662

This species bears a superficial resemblance to Megamelanus dorsalis but the vertex is longer, narrower, the wings are more elongate, brownish fuscous, spotted with white and the genitaliæ are different.

Vertex very long and narrow, not as much narrowed anteriorly as in the allied species; posterior margin nearly straight, median carina extending for only about half the length of the vertex; lateral carinæ strongly elevated; frons much narrowed above to the narrow vertex, strongly produced to the median carina; second segment of the antennæ about twice as long as the first, subglobular. Pronotum slightly shorter than the vertex, disk tricarinate, the lateral carinæ nearly straight and nearly parallel to the median carina. Mesonotum tricarinate; median carina abbreviated on the scutellar portion; fore wings elongate, narrow, nearly five times as long as broad, parallel margined not widened apically. Male pygofer short, broad, the aperture large, subtriangular; genital styles broad; flattening; the inner margins nearly continguous for half their length on the base then suddenly excavated, the apices obliquely truncate; the inner angles produced nearly meeting; anal processes short, blunt, incurved, nearly

meeting on the median line, anal style short, blunt, barely produced beyond the anal segment; last ventral segment of the female triangularly notched to the base; pygofers subterete, exceeding the ovipositors slightly; anal segment short and broad, posterior margin roundly excavated, anal style elongate, subconical.

COLOR: General color of the male, blackish fuscous, pale yellow and whitish; vertex, disk of the pro-and mesonotum pale yellowish white; frons, clypeus, ventral portion of the genæ, breast plates and lateral areas of the mesonotum blackish fuscous; fore wings blackish fuscous; scutellar angle, apex of the clavus, broad triangular marks on the costal and anal borders whitish; legs pale yellowish with the spines and teeth on the calcar and the claws black; abdomen largely blackish fuscous, a row of ochraceous orange spots on each segment; the penultimate and last ventral segments and the pygofer ochraceous orange, the latter more or less clouded with fuscous apically. The female that I associate with this species is almost entirely pale yellowish with the eyes clouded with brownish; the clypeus pale ochraceous buff; the spines, teeth and claws of the leg black; the wings heavily clouded with fuscous apically.

Length, male apex of head to apex of abdomen 2.50 mm.; to the tip of wing 3.15 mm.; across the tegular .50 mm.; female, apex of head to apex of abdomen 3.15 mm.; to the tip of the wing 3.85 mm.; width across the tegulæ .70 mm.

Holotype ♂. Loma, Texas, December 11, 1910. In the collection of the Illinois State Laboratory of Natural History.

Allotype ♀. Loma, Texas, December 11, 1910.

Paratype 1 ♂. Sarita, Texas, December 5, 1911.

Paratype 1 ♂. Ocean Springs, Miss., August 15, 1921. H. L. Dozier.

Megamelus distinctus n. sp.

Figs. 408, 649

This species may be recognized by its pale frons with the black clypeus and distinct genitalia.

Vertex about three times as long as broad, rounded before; frons much narrower between the eyes, nearly twice as wide below; antennæ short, first segment nearly as long as the second; pronotum short, lateral carinæ straight and reaching posterior margin; meso-

notum twice as long as the pronotum, scutellar portion broad, obtuse; calcar tectiform, marginal teeth evident; pygofer of the male broad; genital plates long, triangular; genital styles small, U-shaped; anal segments elongate, the ventral margins produced into two obtuse processes; ædægus long, slender, needle-like.

COLOR: General color testaceous gray, strongly marked with dull black; vertex whitish; posterior and frontal compartments marked with black; frons whitish, this color extended as a broad band across the genæ, the proximal end of the fore coxæ, the breast plates to the mesopleura; first segment of the antennæ and the proximal end of the second similarly colored; the distal end of the second segment black; clypeus black, this color extended as a broad band across the distal end of the coxæ to the metapleura; legs grayish testaceous, more or less clouded with brownish; disk of the pronotum blackish; narrow anterior and posterior borders and the carinæ testaceous gray; mesonotum black, the median carina and the scutellar portion gray; fore wings testaceous gray, the veins ochraceous yellow, faintly pustulate, basilar margin blackish fuscous, claval stem black fuscous to the commissural margin which is broadly blackish fuscous where the claval stem joins it, common stem of medius and cubitus blackish fuscous, this color extending along medius and cubitus for a short distance making a definite Y-shaped mark, veins at the apex brownish fuscous; abdomen black, the pleural pieces and posterior margin of the segments testaceous gray.

Length apex of head to apex of abdomen 2.10 mm.; to the tips of wings 3.15 mm.

Holotype ♂. Portland, Conn., July 25, 1920. B. H. Walden.

Megamelus æstus n. sp.

Figs. 108, 409, 650

This species may be recognized by its general blackish color with a median pale vitta evident dorsally and distinct genitalia.

Vertex narrow, strongly produced; frons much narrowed between the eyes, gradually widened apically; antennæ with the basal segment about as long as the second segment; pronotum a little shorter than the vertex, the intermediate carinæ not strongly divergent; mesonotum about as long as the pronotum, the intermediate carinæ not strongly divergent; male pygofer not strongly inflated; genital

plates flat, obtuse at the apex; genital styles short, about half as long as the genital plates; genital hooks wanting; anal processes four, horn-like.

COLOR: General color blackish fuscous, a broad median vitta pale yellow; frons, antennæ, legs and venter, except the abdomen, pale yellow.

Length, apex of head to apex of abdomen 2.50 mm.

Holotype ♂. Carolina Beach, N. C., June 7, 1920. Z. P. Metcalf.

Megamelus inflatus n. sp.

Figs. 406, 646

This species may be recognized by its almost uniform pale yellow color with the pygofer of the male strongly inflated, genital hooks united into a single obtuse process.

Vertex rather broad, strongly produced; frons narrowed between the eyes, broadened apically, the median frontal carinæ forming a distinct callosity at the apex of the head; antennæ long; first segment almost as long as the second; pronotum elongate, with a distinct impressed point either side of the median carina; intermediate carinæ strongly divergent, reaching the posterior border; mesonotum about as long as the pronotum; calcars small; less than half as long as the basal segment of the tarsus; male pygofer strongly inflated; genital plates flat, incurved at the apex with a small median tooth between; genital styles short, about half as long as the genital plates, obtuse at the apex; genital hooks united on the median line then produced into an elongate obtuse process; anal segments short, anal processes not produced.

COLOR: General color pale yellow, the frons, antennæ and eyes and the lateral margins of the abdomen a little darker.

Length, apex of head to apex of abdomen 2.10 mm.

Holotype ♂. Mill Neck, New York, June 19. N. Banks. In the collection of the Museum of Comparative Zoology.

Paratype ♂. Mill Neck, New York. June 19. N. Banks.

This distinct little species has evidently been confused in the past with *Megamelus notulus* but the male genitalia are entirely distinct.

Megamelus uncus n. sp.

Figs. 410, 411, 651

This species may be recognized by its general pale yellow color with the lateral borders of the abdomen broadly black and distinct male genitalia.

Vertex narrow, produced; frons rather broad, narrow between the eyes first segment of the antennæ about two-thirds as long as the second; pronotum shorter than the vertex; the intermediate carinæ not strongly divergent; mesonotum longer than the pronotum; calcar about half as long as the basal segment of the tarsus; male pygofer broad, the genital plates narrow, triangular; genital styles about as long as the plates; genital hooks elongate, strongly recurved; anal processes two.

COLOR: General color pale yellow; eyes black; metapleura with a large black spot; tarsus spines black; lateral border of the abdomen, the pygofer and most of the venter black.

Length, apex of head to apex of abdomen 2.40 mm.

Holotype ♂. Ellis Bay, Anticosti, Quebec, August 29. In the collection of the Museum of Comparative Zoology.

Allotype ♀. Ellis Bay, Anticosti, Quebec, August 29. In the collection of the Museum of Comparative Zoology.

This is another species that might easily be confused with *Megamelus notulus* Germar; the male genitalia, however, are very distinct.

Megamelus anticostus n. sp.

Figs. 412, 652

This species may be recognized by the evident pale dorsal vitta and distinct male genitalia.

Vertex broad, not much produced; frons broad, not narrowed between the eyes; first segment of the antennæ about half as long as the second; pronotum about as long as the vertex; the intermediate carinæ somewhat divergent; mesonotum longer than the pronotum; calcar about half as long as the basal segment of the tarsus; pygofer of the male broad, not inflated; genital plates narrow, ligulate, broadly separated; genital styles short; their apices bent at right angles; genital hooks elongate, broad and obtuse; anal segments two. spine-like.

COLOR: General color pale yellow, eyes black; the lateral margins of the pronotum and mesonotum, the costal margins of the wings faintly fuscous, the lateral margins of the abdomen blackish, leaving a broad pale median vitta.

Length, apex of head to apex of abdomen 2.50 mm.

Holotype ♂. Ellis Bay, Anticosti, Quebec, August 29.

Allotype ♀. Ellis Bay, Anticosti, Quebec, August 29.

This species might readily be confused with *Megamelus notulus* but the male genitalia are very distinct.

Pissonotus speciosus n. sp.

Figs. 32, 450, 680

This species may be recognized by its small size bright colors and distinct genitalia.

Vertex not short, produced; frons short, the median carina forked just below the apex of the head; pronotum a little longer than the vertex, sinuate posteriorly; mesonotum very small, wings reaching nearly to the pygofers; genital aperture small, ventral sinus produced; genital styles terete at the base broadly curved, the apices expanded and truncate, the inner angles produced meeting on the median line, the basal angles obtusely produced; anal processes strongly produced, obtuse and finger-like apically.

COLOR: General color black and bright ochraceous orange and black, strongly contrasted; vertex and frons black; eyes, genæ and first segment of the antennæ black; clypeus and second segment of antennæ bright ochraceous orange; pronotum black; posterior border broadly white; mesonotum black; wings transparent; scutellar portion of the mesonotum and basal segments of the abdomen bright ochraceous orange; apical segments largely black with distinct white powder, paler in the dorsal line and on the posterior borders; legs pale ochraceous buff.

Length, apex of head to apex of abdomen 1.90 mm.

Holotype ♂. Wrentham, Mass., June 27, 1920. G. W. Barber.

Paratypes 2 ♂ ♂. Wrentham, Mass., June 27, 1920. G. W. Barber.

Pissonotus fulvus n. sp.

Figs. 448, 678

This species may be recognized by its almost uniform ochraceous orange color with only the eyes and tips of the tarsi black.

Vertex elongate, narrow, nearly twice as long as broad; frons elongate, narrow, the median carina forked well below the apex of the head; pronotum shorter than the vertex, the lateral carinæ reaching the posterior border; mesonotum shorter than the vertex; genital aperture elongate, linear; the genital plates triangularly produced; genital styles slender, acute, parallel shorter than the hooks, genital hooks nearly straight, parallel, the apices suddenly constricted acute; anal processes short, incurved.

COLOR: Almost uniform ochraceous orange; eyes black; carinæ of frons sometimes narrowly lined with black; clypeus yellow, tarsal claws black; genital sytles and hooks and the anal process tipped with black.

Length, apex of head to apex of abdomen 2.50-3.00 mm.

Holotype ♂. Paxton, Illinois, July 30, 1916.

Allotype ♀. Paxton, Illinois, July 30, 1916.

Paratype 1 ♂. Metropolis, Illinois, August 19, 1916.

Pissonotus nigridorsum n. sp.

Figs. 449, 679

This species may be recognized by its general shining black color with the clypeus and legs bright yellow.

Vertex broad, broadly rounded anteriorly; frons broad, the median carina forking below the middle of the eyes; antennæ long first segment joint about half as long as the second; pronotum longer than the vertex, the lateral carinæ becoming obsolete before the posterior border; aperture of the pygofer broad; ventral sinus distinct; genital styles large, twisted broader and truncate apically, the inner angle produced and recurved; anal processes short, recurved, their apices concealed by the styles.

COLOR: General color shining black, clypeus and legs except the tip of the tarsi pale yellow.

Length, apex of head to apex of abdomen 2.25 mm.

Holotype ♂. Greenburg, Pa., September 18, 1904. M. Wirtner.

Liburnia shermani n. sp.

Figs. 557, 686

This species is close to *L. campestris* Van Duzee but may be recognized by the entirely distinct genitalia.

Vertex long and narrow, short; lateral carinæ indistinct over the apex of the head; frons broad below about three times as long as broad; posterior margin of the pronotum nearly straight; lateral carinæ strongly curved outward, following the posterior margin of the eyes; calcar short and narrow about half as long as the basal tarsal segment; marginal teeth very minute; male pygofer short, the genital opening notched ventrally, rounded dorsally; genital styles broad at the base, widely separated touching each other medially about one-third of the distance from the margin of the genital aperture then constricted into a narrow neck-like portion which expands apically into a broad mushroom-shaped apex; anal tube with two blunt ventral processes; female genitalia with the pygofers about four times as long as broad, slightly longer than the ovipositor.

COLOR: General color brilliant orange yellow with the following parts marked with black; eyes, genæ, meso-and metapleura and a row of lateral spots on the margins of the abdomen; the frons in the male is deep black, in the female brownish testaceous; the lateral pieces of the pronotum are white in the male and female with the broad posterior margin of the pronotum in the male whitish.

Length, apex of head to apex of abdomen 2 mm.; width of the pronotum .66 mm.

Holotype ♂. Raleigh, N. C., late July. F. Sherman.
Allotype ♀. Raleigh, N. C., late July. F. Sherman.
Paratypes 5 ♀ ♀. Raleigh, N. C., late July. F. Sherman.

Liburnia unda n. sp.

Fig. 709

This is a pale species quite similar to *Liburnia detecta* Van Duzee but may be recognized by its distinct genitalia.

Vertex broad and short; the lateral carinæ distinct over the apex of the head; frons broad, narrowed to about half its width between the eyes; pronotum as long as the vertex; the lateral carinæ divergingly curved outward; mesonotum but little longer than the pro-

notum; calcar rather narrow with the margins strongly reflexed, about two-thirds as long at the basal segment of the tarsi, teeth very fine; pygofers of the male short; the genital aperture broadly oval below the anal tube; the dorsal margin strongly reflexed and touching the anal tube dorsally; genital styles narrow, blunt, their bases contiguous about one-third of the length and then roundly diverging so that their apices are about half of their length apart.

COLOR: Color pale creamy white with the eyes, the lateral margins of the mesonotum, mesopleura, and a row of more or less confluent spots on the lateral margins of the segments of the abdomen blackish; these blackish markings fading to fuscous in the female.

Length, apex of vertex to apex of abdomen 2.50 mm.; width of pronotum .85 mm.

Holotype ♂. Carolina Beach, near Wilmington, N. C., June 6, 1920. Z. P. Metcalf.

Allotype ♀. Carolina Beach, near Wilmington, N. C., June 6, 1920. Z. P. Metcalf.

Paratypes 1 ♂. Carolina Beach, near Wilmington, N. C., June 6, 1920. Z. P. Metcalf.

Liburnia triloba n. sp.

Fig. 702

This species may be recognized by its dull ochraceous brown color, large size and distinct genitalia.

Vertex quadrate, produced anteriorly, a little longer than broad; frons narrow between the eyes, arched ventrally; antennæ long, the second segment about one and one-half times as long as the first; pronotum as long as the vertex, broadly notched posteriorly; mesonotum nearly twice as long as the pronotum, the scutellar portion very large; calcar large and foliaceous, marginal teeth stout; genital aperture elongate, ventral sinus shallow, ventral teeth small, acute, side margins a little inflated; dorsal angles slightly produced; genital styles contiguous, horizontal at the base, strongly projecting posteriorly, the apical portion bent at right angles and trilobed; the inner lobe slender with a ventral tooth, dorsal lobe elongate, marginal lobe obtuse; genital hooks slender, curving posteriorly; anal segment short, processes obtuse.

COLOR: General color testaceous yellow; frons and clypeus brown; eyes black; wings brownish yellow, veins faint on the base a little brown apically; abdomen of the male black, the margins and ventral pieces narrowly bordered with pale yellow.

Length, apex of head to apex of abdomen 2.25 mm.; to the tips of wings 3.30 mm.

Holotype ♂. New Orleans, La.

Paratypes 2 ♂ ♂. Titusville, Fla., November 8, 1911. Cornell University collection.

Liburnia alexanderi n. sp.

Fig. 704

This species may be recognized by the pale yellow color of the head, thorax and legs, the frons, wings and abdomen largely black.

Vertex narrow about twice as long as broad, more produced anteriorly; frons narrow between the eyes widened below; antennæ short, first joint nearly as long as the second; pronotum shorter than the vertex; mesonotum short, lateral carinæ strongly divergent; calcar small, acute; genital aperture large, ventral sinus shallow; genital styles together lyre-shaped, contiguous at the base, their basal angles a little produced, the apical margin broadly recurved, the inner angles a little produced.

COLOR: General color of the head and thorax and legs pale yellow; eyes black, lateral compartments of the frons and clypeus black; the carinæ pale yellow, genæ largely black; wings piceous brown to piceous black, the veins distinct; abdomen piceous brown to black, the broad posterior margins of the abdominal segments and the lateral margins pale yellow.

Length, apex of head to apex of abdomen 1.75 mm.

Holotype ♂. Swannanoa, N. C., August 25, 1919. H. Osborn and Z. P. Metcalf.

Paratypes 1 ♂. Urbana, Illinois. 1 ♂ Dongola, Illinois, August 21, 1916.

1 ♂. Tupelo, Miss., March 22, 1921. H. L. Dozier.

1 ♂. Falls Church, Va., August 24, N. Banks.

Liburnia fulvidorsum n. sp.

Figs. 31, 705

This species may be recognized by the pale yellow color of the frons, vertex, thorax and legs; wings and the abdomen largely black.

Vertex about twice as long as broad, rounded anteriorly, carinæ distinct; frons nearly parallel sided, very little broadened below; antennæ long, reaching the clypeal margin, the second segment twice as long as the first; pronotum elongate, the posterior margin triangularly notched; mesonotum short, the lateral carinæ strongly diverging; calcar foliaceous; rather broad; aperture of the pygofer very broad, triangular below, the dorsal angles strongly produced; genital styles broad, ligulate, truncate at the apex; anal segment short.

COLOR: Head excepting the black eyes pale yellow; thorax including the legs pale yellow, the metapleura with a fuscous spot; brachypterous wings black, opaque; abdomen black, the posterior segments broadly margined with yellow, the lateral margins broadly yellow.

Length, apex of head to apex of abdomen 2.10 mm.

Holotype ♂. Brownsville, Texas, December 10, 1910.

Paratypes 2 ♂ ♂. Brownsville, Texas, December 10, 1910.

Liburnia gerhardi n. sp.

Figs. 703, 496

This species may be recognized by its general bright ochraceous yellow color with the frons narrow and distinct genitalia.

Vertex about one and one-half times as broad as long, distinctly carinate, broadly rounded at the frons; frons narrow, elongate, the sides a little arched below the eyes; antennæ elongate, the first segment about as long as the second; pronotum about as long as the vertex, broadly sinuate posteriorly; mesonotum large, the scutellar portion occupying about half its length, lateral carinæ broadly divergent; calcar very large, foliaceous, nearly as long as the basal segment of the tarsus; genital aperture very large, ventral sinus triangular, deep, the ventral angles a little produced, dorsal angles strongly produced; genital styles contiguous at the base, the basal angles roundly produced posteriorly, the stems strongly divergent, the

apical portion broad and flat, the outer angle produced dorsad to near the dorsal angle, the inner angle reflexed, produced into a strong finger-like process; anal segments short, anal processes slender, incurved, reaching the dorsal margin of the diaphragm.

COLOR: General color bright ochraceous yellow, shining; eyes black; pleural pieces and abdomen black, the lateral margins and posterior borders of the segments narrowly yellow.

Length, apex of head to apex of abdomen 2.95 mm.; to the tips of wings 5.25 mm.

Holotype 1 ♂. Beverly Hills, Ill., August 31, 1907. W. J. Gerhard.

Allotype 1 ♀. Beverly Hills, Ill., August 31, 1907. W. J. Gerhard.

Paratype 1 ♀. Chicago, Ill., July 5, 1907.

I take pleasure in naming this species for Mr. W. J. Gerhard who very kindly loaned me his entire collection of *Fulgoridæ* for study.

Liburnia staminata n. sp.

Fig. 706

This species may be recognized by its pale color with the frons strongly constricted between eyes, the genital styles slender; the apices suddenly expanded.

Head broad; vertex narrow, strongly produced; lateral margins converging anteriorly and the carinæ strong over the apex of the head; frons broad strongly narrowed between the eyes broadest at about the level of the antennæ, converging toward the clypeus; antennæ reaching the clypeal margin, first segment nearly as long as second; pronotum longer than vertex, distinctly notched posteriorly; mesonotum transverse, the scutellar portion large; calcar very long, longer than the basal segment of the tarsus; pygofer of male long, genital aperture large, ventral sinus shallow; genital styles slender, contiguous at the base, diverging from each other at an angle of about eighty-five degrees; the apices suddenly expanded stamen-like; the dorsal margin of diaphragm produced into a short nearly quadrate median tooth; anal segment short; anal processes broadly triangular reaching the dorsal margin of the diaphragm.

COLOR: General color dull ochraceous yellow; eyes black, tips of tarsi black; wings ochraceous yellow, the veins brighter; anal segment fuscous brown.

Length, apex of head to apex of abdomen 2.80 mm.; to tips of wings 3.50 mm.

Holotype ♂. Chicago, Ill., July 25. W. J. Gerhard.

Liburnia waldeni n. sp.

Fig. 698

This species may be recognized by its uniform dull brown color and short male pygofer.

Vertex rather narrow, elongate; carinæ fairly distinct over the apex of the head; frons narrowed between the eyes, a little arched below; antennæ reaching well beyond the clypeal margin; pronotum nearly as long as the vertex, the lateral carinæ not strongly reflexed; pygofer of the male short, truncate caudally, the genital aperture large, the genital styles long, ligulate, a little arched, their apices acute meeting in the median line just below the anal segment, which is definitely incised on the ventral margin and triangularly produced on each side.

COLOR: General color dull blackish brown; antennæ and legs buffy, lateral margins of the abdomen with large pale spots, wings brownish, the veins darker.

Length, apex of head to apex of abdomen 2.10 mm.; to tips of wings 3.30 mm.

Holotype ♂. New Haven, Conn., August 8, 1920. B. H. Walden.

Criomorphus conspicuus n. sp.

Figs. 105, 391, 392, 549, 635

This species has a general resemblance to *Phyllodinus flabellatus* Ball but the tibiæ are terete, not expanded and the median frontal carina is forked on the clypeal margin.

Head wide, about as wide as the pronotum; vertex about as broad as long; median carina short, the lateral compartments elongate, reaching almost to the base of the vertex; posterior margin of the vertex nearly straight; anterior margin slightly arched; frons about twice as long as broad, lateral margins curved; median carina of the frons forked nearly to the clypeal margins, the two prongs of the fork conspicuous on the apex of the head; antennæ with first segment about half as long as second, the second segment clavate. Pronotum

nearly as long as the vertex, posterior margin nearly straight. Mesonotum small, carinæ wanting or very faint. Brachypterous wings short, reaching the second segment; abdomen short and stout. Male pygofer short, broad, about twice as broad as long; aperture broad, triangularly excavated ventrally; genital styles slender, nearly horizontal; the inner margin expanded to the middle then suddenly constricted, the styles ending in acute reflexed tips; anal segment short, the anal processes long, acutely pointed, anal styles short, barely exserted.

COLOR: General color black with the head, thorax and legs largely testaceous yellow, the posterior margin of the pronotum and the apical margin of the wings bordered with whitish; head testaceous yellow; eyes blackish; frons with the carinæ narrowly bordered with fuscous. Pronotum testaceous yellow; posterior border margined with whitish. Mesonotum testaceous yellow, the posterior borders whitish; fore wings blackish, the apical margins bordered with whitish; legs testaceous yellow; femora lineate with fuscous; claws and spines blackish; abdomen shining black with each dorsal segment with a median testaceous yellow dash on the posterior border; pygofer fuscous and anal segments bordered with yellow posteriorly.

Length, apex of head to apex of abdomen 2.60 mm.

Holotype ♀. New Haven, Conn., June 1920. B. H. Walden.

Paratypes 1 ♀. Urbana, Ill., June 1913. 1 ♀. Forest Hills, Mass., August 1919.

This is a very pretty little species and has apparently escaped attention previously.

EXPLANATION OF PLATES

PLATE 38

Fig. 1. Amycle vernalis Manee.
Fig. 2. Aphelonema rosa Metcalf.
Fig. 3. Cyrpoptus belfragei Stal.
Fig. 4. Poblicia misella Stal.
Fig. 5. Poblicia fuliginosa Olivier.
Fig. 6. Phylloscelis atra albovenosa Melichar.
Fig. 7. Megamelus angulatus Osborn.
Fig. 8. Phylloscelis pallescens Germar.
Fig. 9. Poblicia constellata Walker.
Fig. 10. Ormenis rufifascia Walker.
Fig. 11. Aphelonema bivittata Ball.
Fig. 12. Acanalonia bivittata Say.
Fig. 13. Ormenis pruinosa Say.

PLATE 39

Fig. 14. Catonia nava Say.
Fig. 15. Flatoides scabrosus Melichar.
Fig. 16. Flatoides fuscus Van Duzee.
Fig. 17. Flatoides maculosus Metcalf.
Fig. 18. Megamelanus terminalis Metcalf.
Fig. 19. Pentagramma vittatifrons Uhler.
Fig. 20. Myndus slossoni Ball.
Fig. 21. Pissonotus guttatus Spooner.
Fig. 22. Laccocera zonata Van Duzee.

PLATE 40

Fig. 23. Euklastus harti Metcalf.
Fig. 24. Amalopota uhleri Van Duzee.
Fig. 25. Amalopota fitchi Van Duzee.
Fig. 26. Patara vanduzei Ball.
Fig. 27. Otiocerus degeerii Kirby.
Fig. 28. Otiocerus coquebertii Kirby.
Fig. 29. Liburnia campestris Van Duzee.
Fig. 30. Bruchomorpha bicolor Metcalf.
Fig. 31. Liburnia fulvidorsum Metcalf.
Fig. 32. Pissonotus speciosus Metcalf.
Fig. 33. Otiocerus stollii Kirby.
Fig. 34. Otiocerus abbotii Kirby.
Fig. 35. Otiocerus wolfii Kirby.
Fig. 36. Otiocerus schellenbergii Kirby.
Fig. 37. Fitchiella robertsoni Fitch.
Fig. 38. Megamelanus lautus Metcalf.

PLATE 41

Fig. 39. Cyarda melichari Van Duzee.
Fig. 40. Cyarda acuminipennis Spinola.
Fig. 41. Rhyncopteryx caudata Van Duzee.
Fig. 42. Scolopsella reticulata Ball.
Fig. 43. Crepusia glauca Metcalf.
Fig. 44. Pelitropis rotulata Van Duzee.
Fig. 45. Neurotmeta sponsa Guerin.
Fig. 46. Phylloscelis atra Germar.
Fig. 47. Epiptera septentrionalis Provancher, face.
Fig. 48. Epiptera variegata Van Duzee, face.
Fig. 49. Epiptera opaca Say, face.
Fig. 50. Fitchiella melichari Ball.
Fig. 51. Bruchomorpha dorsata Fitch.

PLATE 42

Fig. 52. Scolops sulcipes Say.
Fig. 53. Scolops perdix Uhler.
Fig. 54. Bruchomorpha suturalis Melichar.
Fig. 55. Bruchomorpha vittata Metcalf.
Fig. 56. Bruchomorpha rugosa Metcalf.
Fig. 57. Bruchomorpha decorata Metcalf.
Fig. 58. Aphelonema rugosa Ball.
Fig. 59. Aphelonema histrionica Stal.
Fig. 60. Misodema reticulata Uhler (after Melichar).
Fig. 61. Dictyonissus griphus Uhler (after Melichar).
Fig. 62. Traxus fulvus Metcalf.

PLATE 43

Fig. 63. Issus servillei Spinola.
Fig. 64. Picumna ovatipennis Walker.
Fig. 65. Issomorphus maculatus Melichar.
Fig. 66. Hysteropterum punctiferum Walker.
Fig. 67. Thionia simplex Germar.
Fig. 68. Catonia dimidata Van Duzee, face.
Fig. 69. Catonia impunctata Fitch, face.
Fig. 70. Catonia bicinctura Van Duzee, face.
Fig. 71. Catonia cinctifrons Fitch, face.
Fig. 72. Epiptera opaca Say.
Fig. 73. Catonia impunctata Fitch.
Fig. 74. Oliarus vittatus Metcalf.
Fig. 75. Oliarus cinnamomeus Provancher.

PLATE 44

Fig. 76. Microledrida fulva Metcalf.
Fig. 77. Ciocixius dorsivittatus Van Duzee.

Fig. 78. Cixius apicalis Metcalf.
Fig. 79. Cixius basalis Van Duzee.
Fig. 80. Bothriocera undata Fabricius, fore wing.
Fig. 81. Bothriocera drakei Metcalf, fore wing.
Fig. 82. Bothriocera tinealis Burmeister, fore wing.
Fig. 83. Bothriocera westwoodi Stal, fore wing.
Fig. 84. Bothriocera bicornis Fabricius.
Fig. 85. Oeclidius nanus Van Duzee.
Fig. 86. Oecleus borealis Van Duzee.
Fig. 87. Anotia bonnetii Kirby.
Fig. 88. Anotia westwoodi Fitch.
Fig. 89. Anotia sayi Ball.
Fig. 90. Anotia kirkaldyi Ball.

PLATE 45

Fig. 91. Mysidia mississippiensis Dozier.
Fig. 92. Neocenchrea heidemanni Ball.
Fig. 93. Phaciocephalus uhleri Ball.
Fig. 94. Herpis maculata Van Duzee.
Fig. 95. Stobæra tricarinata Say.
Fig. 96. Copicerus irroratus Swartz.
Fig. 97. Bostæra nasuta Ball.
Fig. 98. Bakerella maculata Crawford.
Fig. 99. Laccocera vittipennis Van Duzee.
Fig. 100. Saccharosydne saccharivorus Westwood.
Fig. 101. Stenocranus vittatus Stal.
Fig. 102. Phyllodinus nervatus Van Duzee.
Fig. 103. Phyllodinus flabellatus Ball.

PLATE 46

Fig. 104. Macrotomella carinata Van Duzee.
Fig. 105. Criomorphus conspicuus Metcalf.
Fig. 106. Liburniella ornata Say.
Fig. 107. Megamelus palaetus Van Duzee.
Fig. 108. Megamelus æstus Metcalf.
Fig. 109. Kelisia axialis Van Duzee.
Fig. 110. Megamelanus dorsalis Metcalf.
Fig. 111. Peregrinus maidis Ashmead.
Fig. 112. Liburnia slossoni Ball.
Fig. 113. Liburnia albolineosa Fowler.
Fig. 114. Liburnia teapea Fowler.
Fig. 115. Pissonotus quadripustulatus Van Duzee.
Fig. 116. Pissonotus aphidioides Van Duzee.
Fig. 117. Pissonotus dorsalis Van Duzee.

PLATE 47

Fig. 118. Acanalonia pumila Van Duzee.
Fig. 119. Myndus enotatus Van Duzee.
Fig. 120. Dictyophara microrhina Walker.
Fig. 121. Liburnia detecta Van Duzee.
Fig. 122. Megamelanus elongatus Ball.
Fig. 123. Megamelanus spartini Osborn.

PLATE 48

Fig. 124. Acanalonia conica, dorsal view.
Fig. 125. Acanalonia conica, lateral view.
Fig. 126. Acanalonia pumila, dorsal view.
Fig. 127. Acanalonia fasciata, dorsal view.
Fig. 128. Acanalonia servillei, frontal view.
Fig. 129. Acanalonia bivittata, dorsal view.
Fig. 130. Acanalonia virescens, dorsal view.
Fig. 131. Acanalonia concinnula, dorsal view.
Fig. 132. Acanalonia immaculata, dorsal view.
Fig. 133. Acanalonia latifrons, dorsal view.
Fig. 134. Acanalonia servillei, lateral view.
Fig. 135. Acanalonia servillei, dorsal view.
Fig. 136. Cyarda melichari, dorsal view.
Fig. 137. Cyarda melichari, frontal view.
Fig. 138. Cyarda walkeri, dorsal view.
Fig. 139. Cyarda acuminipennis, dorsal view.
Fig. 140. Rhynchopteryx caudata, dorsal view.
Fig. 141. Ormenis chloris, frontal view.
Fig. 142. Ormenis rufifascia, frontal view.
Fig. 143. Ormenis venusta, frontal view.
Fig. 144. Ormensis septentrionalis, frontal view.
Fig. 145. Flatoides maculosus, dorsal view.
Fig. 146. Flatoides fuscus, dorsal view.
Fig. 147. Flatoides tortrix, dorsal view.

PLATE 49

Fig. 148. Flatoides insularis, dorsal view.
Fig. 149. Flatoides punctatus, dorsal view.
Fig. 150. Flatoides consisus, dorsal view.
Fig. 151. Flatoides acutus, dorsal view.
Fig. 152. Flatoides signatus, dorsal view.
Fig. 153. Flatoides signatus, frontal view.
Fig. 154. Flatoides scabrosus, dorsal view.
Fig. 155. Flatoides scabrosus, frontal view.
Fig. 156. Scolopsella reticulata, dorsal view.
Fig. 157. Scolopsella reticulata, frontal view.
Fig. 158. Scolopsella reticulata, lateral view.

Fig. 159. Amycle vernalis, dorsal view.
Fig. 160. Amycle vernalis, frontal view.
Fig. 161. Amycle vernalis, lateral view.
Fig. 162. Amycle saxatilis, dorsal view.
Fig. 163. Crepusia glauca, dorsal view.
Fig. 164. Crepusia glauca, frontal view.
Fig. 165. Cyrpoptus belfragei, dorsal view.
Fig. 166. Cyrpoptus belfragei, frontal view.
Fig. 167. Cyrpoptus belfragei, lateral view.
Fig. 168. Cyrpoptus reineckei, dorsal view.
Fig. 169. Cyrpoptus nubeculosus, dorsal view.
Fig. 170. Poblicia constellata, dorsal view.
Fig. 171. Poblicia constellata, frontal view.

PLATE 50

Fig. 172. Poblicia fuliginosa, dorsal view.
Fig. 173. Poblicia fuliginosa, frontal view.
Fig. 174. Poblicia fuliginosa, lateral view.
Fig. 175. Poblicia thanatophana, dorsal view.
Fig. 176. Poblicia thanatophana, frontal view.
Fig. 177. Pelitropis rotulata, dorsal view.
Fig. 178. Pelitropis rotulata, frontal view.
Fig. 179. Neurotmeta sponsa, dorsal view.
Fig. 180. Neurotmeta sponsa, frontal view.
Fig. 181. Monopsis tabida, frontal view (after Spinola)
Fig. 182. Phylloscelis atra, dorsal view.
Fig. 183. Phylloscelis atra, frontal view.
Fig. 184. Scolops sulcipes, dorsal view.
Fig. 185. Scolops osborni, dorsal view.
Fig. 186. Scolops parvulus, dorsal view.
Fig. 187. Scolops hesperius, dorsal view.
Fig. 188. Scolops grossus, dorsal view.
Fig. 189. Scolops grossus, frontal view.
Fig. 190. Scolops angustatus, dorsal view.
Fig. 191. Scolops angustatus, frontal view.
Fig. 192. Scolops perdix, dorsal view.
Fig. 193. Scolops viridis, dorsal view.
Fig. 194. Scolops desiccatus, dorsal view.
Fig. 195. Scolops robustus, dorsal view.

PLATE 51

Fig. 196. Scolops spurcus, dorsal view.
Fig. 197. Scolops vanduzei, dorsal view.
Fig. 198. Scolops spurcus, lateral view.
Fig. 199. Dictyophara microrhina, dorsal view.
Fig. 200. Dictyophara microrhina, frontal view.

Fig. 201. Dictyophara recurva, dorsal view.
Fig. 202. Dictyophara recurva, frontal view.
Fig. 203. Dictyophara recurva, lateral view.
Fig. 204. Dictyophara florens, dorsal view.
Fig. 205. Dictyophara lingula, dorsal view.
Fig. 206. Dictyophara lingula, frontal view.
Fig. 207. Fitchiella robertsoni, dorsal view.
Fig. 208. Dictyophara florens, frontal view.
Fig. 209. Fitchiella fitchi, dorsal view.
Fig. 210. Fitchiella melichari, dorsal view.
Fig. 211. Fitchiella melichari, lateral view.
Fig. 212. Bruchomorpha tristis, lateral view.
Fig. 213. Bruchomorpha minima, lateral view.
Fig. 214. Bruchomorpha dorsata, lateral view.
Fig. 215. Bruchomorpha oculata, dorsal view.
Fig. 216. Bruchomorpha oculata, lateral view.
Fig. 217. Bruchomorpha nasuta, dorsal view.
Fig. 218. Bruchomorpha nasuta, lateral view.
Fig. 219. Bruchomorpha suturalis, lateral view.

PLATE 52

Fig. 220. Bruchomorpha vittata, lateral view.
Fig. 221. Bruchomorpha pallidipes, lateral view.
Fig. 222. Bruchomorpha rugosa, lateral view.
Fig. 223. Bruchomorpha decorata, lateral view.
Fig. 224. Bruchomorpha bicolor, lateral view.
Fig. 225. Bruchomorpha jocosa, lateral view.
Fig. 226. Aphelonema rosa, dorsal view.
Fig. 227. Aphelonema rosa, frontal view.
Fig. 228. Aphelonema obscura, dorsal view.
Fig. 229. Aphelonema obscura, frontal view.
Fig. 230. Aphelonema simplex, dorsal view.
Fig. 231. Aphelonema simplex, frontal view.
Fig. 232. Aphelonema bivittata, dorsal view.
Fig. 233. Aphelonema bivittata, frontal view.
Fig. 234. Aphelonema rugosa, dorsal view.
Fig. 235. Aphelonema rugosa, frontal view.
Fig. 236. Aphelonema histrionica, dorsal view.
Fig. 237. Aphelonema histrionica, frontal view.
Fig. 238. Traxus fulvus, dorsal view.
Fig. 239. Traxus fulvus, frontal view.
Fig. 240. Issus servillei, dorsal view.
Fig. 241. Issus servillei, frontal view.
Fig. 242. Picumna ovatipennis, dorsal view.
Fig. 243. Picumna ovatipennis, frontal view.

PLATE 53

Fig. 244. Issomorphus maculatus, dorsal view.
Fig. 245. Issomorphus maculatus, frontal view.
Fig. 246. Hysteropterum punctiferum, dorsal view.
Fig. 247. Hysteropterum punctiferum, frontal view.
Fig. 248. Thionia simplex, dorsal view.
Fig. 249. Thionia simplex, frontal view.
Fig. 250. Thionia elliptica, dorsal view.
Fig. 251. Thionia elliptica, frontal view.
Fig. 252. Thionia producta, dorsal view.
Fig. 253. Thionia producta, frontal view.
Fig. 254. Thionia ocellata, dorsal view.
Fig. 255. Thionia quinquata, dorsal view.
Fig. 256. Thionia bullata, dorsal view.
Fig. 257. Thionia bullata, frontal view.
Fig. 258. Epiptera floridæ, dorsal view.
Fig. 259. Epiptera septentrionalis, dorsal view.
Fig. 260. Epiptera variegata, dorsal view.
Fig. 261. Epiptera slossoni, dorsal view.
Fig. 262. Epiptera pallida, dorsal view.
Fig. 263. Epiptera brittoni, dorsal view.
Fig. 264. Epiptera colorata, dorsal view.
Fig. 265. Epiptera opaca, dorsal view.
Fig. 266. Catonia grisea, dorsal view.
Fig. 267. Oliarus cinnamomeus, dorsal view.

PLATE 54

Fig. 268. Oliarus humilis, dorsal view.
Fig. 269. Oliarus montanus, dorsal view.
Fig. 270. Oliarus placitus, dorsal view.
Fig. 271. Oliarus difficilis, dorsal view.
Fig. 272. Oliarus franciscanus, dorsal view.
Fig. 273. Oliarus aridus, dorsal view.
Fig. 274. Oliarus quinquelineatus, dorsal view.
Fig. 275. Oliarus texanus, dorsal view.
Fig. 276. Oliarus vittatus, dorsal view.
Fig. 277. Oliarus vicarius, dorsal view.
Fig. 278. Monorachis sordulentus, dorsal view.
Fig. 279. Monorachis sordulentus, frontal view.
Fig. 280. Microledrida fulva, dorsal view.
Fig. 281. Microledrida fulva, frontal view.
Fig. 282. Ciocixius dorsivittatus, dorsal view.
Fig. 283. Ciocixius dorsivittatus, frontal view.
Fig. 284. Cixius apicalis, dorsal view.
Fig. 285. Cixius apicalis, frontal view.
Fig. 286. Cixius cultus, dorsal view.

Fig. 287. Cixius stigmatus, dorsal view.
Fig. 288. Cixius misellus, dorsal view.
Fig. 289. Cixius colœpium, dorsal view.
Fig. 290. Cixius basalis, dorsal view.
Fig. 291. Cixius pini, dorsal view.

PLATE 55

Fig. 292. Bothriocera bicornis, dorsal view.
Fig. 293. Bothriocera bicornis, frontal view.
Fig. 294. Bothriocera bicornis, lateral view.
Fig. 295. Oeclidius nanus, dorsal view.
Fig. 296. Oeclidius nanus, frontal view.
Fig. 297. Oecleus decens, dorsal view.
Fig. 298. Oecleus productus, dorsal view.
Fig. 299. Oecleus fulvidorsum, dorsal view.
Fig. 300. Oecleus lineatus, dorsal view.
Fig. 301. Oecleus obtusus, dorsal view.
Fig. 302. Oecleus borealis, dorsal view.
Fig. 303. Oecleus borealis, frontal view.
Fig. 304. Myndus fulvus, dorsal view.
Fig. 305. Myndus slossoni, dorsal view.
Fig. 306. Myndus radicis, dorsal view.
Fig. 307. Myndus radicis, frontal view.
Fig. 308. Myndus enotatus, dorsal view.
Fig. 309. Myndus viridis, dorsal view.
Fig. 310. Myndus pusillus, dorsal view.
Fig. 311. Myndus pictifrons, dorsal view.
Fig. 312. Myndus truncatus, dorsal view.
Fig. 313. Myndus sordidipennis, dorsal view.
Fig. 314. Myndus delicatus, dorsal view.
Fig. 315. Otiocerus degeerii, dorsal view.

PLATE 56

Fig. 316. Otiocerus degeerii, frontal view.
Fig. 317. Otiocerus degeerii, lateral view.
Fig. 318. Otiocerus abbotii, dorsal view.
Fig. 319. Otiocerus abbotii, lateral view.
Fig. 320. Otiocerus wolfii, dorsal view.
Fig. 321. Otiocerus wolfii, lateral view.
Fig. 322. Otiocerus amyotii, dorsal view.
Fig. 323. Otiocerus amyotii, lateral view.
Fig. 324. Otiocerus signoretii, dorsal view.
Fig. 325. Otiocerus signoretii, lateral view.
Fig. 326. Otiocerus stollii, dorsal view.
Fig. 327. Otiocerus stollii, lateral view.
Fig. 328. Otiocerus schellenbergii, dorsal view.

Fig. 329. Otiocerus schellenbergii, lateral view.
Fig. 330. Otiocerus coquebertii, dorsal view.
Fig. 331. Otiocerus coquebertii, lateral view.
Fig. 332. Otiocerus kirbyii, dorsal view.
Fig. 333. Otiocerus kirbyii, lateral view.
Fig. 334. Euklastus harti, dorsal view.
Fig. 335. Euklastus harti, frontal view.
Fig. 336. Euklastus harti, lateral view.
Fig. 337. Amalopota fitchi, dorsal view.
Fig. 338. Amalopota fitchi, lateral view.
Fig. 339. Amalopota uhleri, dorsal view.

PLATE 57

Fig. 340. Amalopota uhleri, frontal view.
Fig. 341. Amalopota uhleri, lateral view.
Fig. 342. Anotia burnetii, dorsal view.
Fig. 343. Anotia burnetii, lateral view.
Fig. 344. Anotia bonnetii, dorsal view.
Fig. 345. Anotia bonnetii, frontal view.
Fig. 346. Anotia bonnetii, lateral view.
Fig. 347. Anotia robertsoni, dorsal view.
Fig. 348. Anotia robertsoni, lateral view.
Fig. 349. Anotia westwoodi, dorsal view.
Fig. 350. Anotia westwoodi, lateral view.
Fig. 351. Anotia sayi, dorsal view.
Fig. 352. Anotia sayi, lateral view.
Fig. 353. Anotia kirkaldyi, dorsal view.
Fig. 354. Anotia kirkaldyi, lateral view.
Fig. 355. Patara vanduzei, dorsal view.
Fig. 356. Patara vanduzei, frontal view.
Fig. 357. Patara vanduzei, lateral view.
Fig. 358. Mysidia mississippiensis, dorsal view.
Fig. 359. Neocenchrea heidemanni, dorsal view.
Fig. 360. Neocenchrea heidemanni, frontal view.
Fig. 361. Phaciocephalus fulvus, dorsal view.
Fig. 362. Phaciocephalus fulvus, frontal view.
Fig. 363. Phaciocephalus uhleri, dorsal view.
Fig. 364. Phaciocephalus uhleri, frontal view.

PLATE 58

Fig. 365. Herpis maculata, dorsal view.
Fig. 366. Herpis vulgaris, dorsal view.
Fig. 367. Herpis vulgaris, frontal view.
Fig. 368. Stobæra pallida, dorsal view.
Fig. 369. Stobæra pallida, frontal view.
Fig. 370. Stobæra tricarinata, dorsal view.

Fig. 371. Stobæra tricarinata, frontal view.
Fig. 372. Stobæra minuta, dorsal view.
Fig. 373. Stobæra minuta, frontal view.
Fig. 374. Copiocerus irroratus, dorsal view.
Fig. 375. Copiocerus irroratus, frontal view.
Fig. 376. Pentagramma minore, dorsal view.
Fig. 377. Pentagramma minore, frontal view.
Fig. 378. Pentagramma vittatifrons, dorsal view.
Fig. 379. Pentagramma vittatifrons, frontal view.
Fig. 380. Bostæra nasuta, dorsal view.
Fig. 381. Bostæra nasuta, frontal view.
Fig. 382. Bakerella maculata, dorsal view.
Fig. 383. Bakerella maculata, frontal view.
Fig. 384. Laccocera vittipennis, dorsal view.
Fig. 385. Laccocera vittipennis, frontal view.
Fig. 386. Laccocera zonata, dorsal view.
Fig. 387. Phyllodinus nervatus, dorsal view.
Fig. 388. Phyllodinus nervatus, frontal view.

PLATE 59

Fig. 389. Macrotomella carinata, dorsal view.
Fig. 390. Macrotomella carinata, frontal view.
Fig. 391. Criomorphus conspicuus, dorsal view.
Fig. 392. Criomorphus conspicuus, frontal view.
Fig. 393. Liburniella ornata, dorsal view.
Fig. 394. Liburniella ornata, frontal view.
Fig. 395. Saccharosydne saccharivorus, dorsal view.
Fig. 396. Saccharosydne saccharivorus, frontal view.
Fig. 397. Saccharosydne saccharivorus, lateral view.
Fig. 398. Stenocranus similis, dorsal view.
Fig. 399. Stenocranus arundineus, dorsal view.
Fig. 400. Stenocranus arundineus, frontal view.
Fig. 401. Stenocranus felti, dorsal view.
Fig. 402. Stenocranus felti, frontal view.
Fig. 403. Stenocranus vittatus, dorsal view.
Fig. 404. Stenocranus dorsalis, dorsal view.
Fig. 405. Megamelus palaetus, dorsal view.
Fig. 406. Megamelus inflatus, dorsal view.
Fig. 407. Megamelus longicornis, dorsal view.
Fig. 408. Megamelus distinctus, dorsal view.
Fig. 409. Megamelus æstus, dorsal view.
Fig. 410. Megamelus uncus, dorsal view.
Fig. 411. Megamelus uncus, lateral view.
Fig. 412. Megamelus anticostus, dorsal view.
Fig. 413. Megamelus angulatus, dorsal view.
Fig. 414. Megamelus davisi, dorsal view.

PLATE 60

Fig. 415. Prokelisia marginata, dorsal view.
Fig. 416. Prokelisia marginata, frontal view.
Fig. 417. Prokelisia marginata, lateral view.
Fig. 418. Prokelisia setigera, dorsal view.
Fig. 419. Prokelisia setigera, dorsal view.
Fig. 420. Kelisia axialis, dorsal view.
Fig. 421. Kelisia axialis, frontal view.
Fig. 422. Kelisia axialis, lateral view.
Fig. 423. Kelisia crocea, dorsal view.
Fig. 424. Kelisia parvula, dorsal view.
Fig. 425. Megamelanus terminalis, dorsal view.
Fig. 426. Megamelanus terminalis, lateral view.
Fig. 427. Megamelanus lautus, dorsal view.
Fig. 428. Megamelanus lautus, lateral view.
Fig. 429. Megamelanus elongatus, dorsal view.
Fig. 430. Megamelanus elongatus, frontal view.
Fig. 431. Megamelanus elongatus, lateral view.
Fig. 432. Megamelanus dorsalis, dorsal view.
Fig. 433. Megamelanus dorsalis, lateral view.
Fig. 434. Megamelanus spartini, dorsal view.
Fig. 435. Megamelanus spartini, lateral view.
Fig. 436. Peregrinus maidis, dorsal view.
Fig. 437. Peregrinus maidis, frontal view.

PLATE 61

Fig. 438. Pissonotus quadripustulatus, dorsal view.
Fig. 439. Pissonotus aphidioides, dorsal view.
Fig. 440. Pissonotus brunneus, dorsal view.
Fig. 441. Pissinotus dorsalis, dorsal view.
Fig. 442. Pissonotus ater, dorsal view.
Fig. 443. Pissonotus marginatus, dorsal view.
Fig. 444. Pissonotus pallipes, dorsal view.
Fig. 445. Pissonotus guttatus, dorsal view.
Fig. 446. Pissonotus basalis, dorsal view.
Fig. 447. Pissonotus delicatus, dorsal view.
Fig. 448. Pissonotus fulvus, dorsal view.
Fig. 449. Pissonotus nigridorsum, dorsal view.
Fig. 450. Pissonotus speciosus, dorsal view.
Fig. 451. Liburnia lutulenta, dorsal view.
Fig. 452. Liburnia lutulenta, frontal view.
Fig. 453. Liburnia campestris, dorsal view.
Fig. 454. Liburnia slossoni, dorsal view.
Fig. 455. Liburnia pellucida, dorsal view.
Fig. 456. Liburnia pellucida, frontal view.
Fig. 457. Liburnia albolineosa, dorsal view.

Fig. 458. Liburnia albolineosa, frontal view.
Fig. 459. Liburnia teapea, dorsal view.
Fig. 460. Liburnia teapea, frontal view.
Fig. 461. Liburnia puella, dorsal view.

PLATE 62

Fig. 462. Acanalonia conica, antennæ.
Fig. 463. Flatoides tortrix, antennæ.
Fig. 464. Scolopsella reticulata, antennæ.
Fig. 465. Amycle saxatilis, antennæ.
Fig. 466. Crepusia glauca, antennæ.
Fig. 467. Cyrpoptus belfragei, antennæ.
Fig. 468. Poblicia fuliginosa, antennæ.
Fig. 469. Pelitropis rotulata, antennæ.
Fig. 470. Neurotmeta sponsa, antennæ.
Fig. 471. Phylloscelis albovenosa, antennæ.
Fig. 472. Scolops perdix, antennæ.
Fig. 473. Dictyophara microrhina, antennæ.
Fig. 474. Traxus fulvus, antennæ.
Fig. 475. Epiptera variegata, antennæ.
Fig. 476. Cixius colœpium, antennæ.
Fig. 477. Bothriocera bicornis, antennæ.
Fig. 478. Otiocerus degeerii, antennæ.
Fig. 479. Euklastus harti, antennæ.
Fig. 480. Amalopota fitchi, antennæ.
Fig. 481. Anotia westwoodi, antennæ.
Fig. 482. Anotia sayi antennæ.
Fig. 483. Patara vanduzei, antennæ.
Fig. 484. Mysidia mississippiensis, antennæ.
Fig. 485. Neocenchrea heidemanni, antennæ.
Fig. 486. Herpis incisa, antennæ.
Fig. 487. Stobæra pallida, antennæ.
Fig. 488. Copiocerus irroratus, antennæ.
Fig. 489. Pentagramma vittatifrons, antennæ.
Fig. 490. Bostæra nasuta, antennæ.
Fig. 491. Bakerella maculata, antennæ.
Fig. 492. Laccocera vittipennis, antennæ.
Fig. 493. Saccharosydne saccharivorus, antennæ.
Fig. 494. Stenocranus similis, antennæ.
Fig. 495. Stenocranus vittatus, antennæ.
Fig. 496. Liburnia gerhardi, antennæ.

PLATE 63

Fig. 497. Acanalonia latifrons, wing.
Fig. 498. Ormenis venusta, wing.
Fig. 499. Ormenis septentrionalis, wing.

Fig. 500. Ormenis relicta, wing.
Fig. 501. Cyrpoptus belfragei, wing.
Fig. 502. Cyrpoptus reinecki, wing.
Fig. 503. Poblicia fuliginosa, fore wing.
Fig. 504. Poblicia fuliginosa, hind wing.
Fig. 505. Pelitropis rotulata, wing.
Fig. 506. Neurotmeta sponsa, wing.
Fig. 507. Monopsis tabida, wing (after Spinola).
Fig. 508. Scolops perdix, wing.
Fig. 509. Dictyophara dioxys, wing.
Fig. 510. Dictyophara microrhina, wing.
Fig. 511. Bruchomorpha oculata, wing.
Fig. 512. Issus servillei, wing.

PLATE 64

Fig. 513. Picumna ovatipennis, wing.
Fig. 514. Issomorphus maculatus, wing.
Fig. 515. Thionia bullata, wing.
Fig. 516. Epiptera opaca, wing.
Fig. 517. Oecleus borealis, wing.
Fig. 518. Myndus pictifrons, wing.
Fig. 519. Otiocerus degeerii, wing.
Fig. 520. Euklastus harti, wing.
Fig. 521. Anotia bonnetii, wing.
Fig. 522. Patara vanduzei, wing.
Fig. 523. Neocenchrea heidemanni, wing.
Fig. 524. Phaciocephalus uhleri, wing.
Fig. 525. Herpis vulgaris, wing.
Fig. 526. Liburniella ornata, wing.
Fig. 527. Saccharosydne saccharivorus, wing.
Fig. 528. Stenocranus vittatus, wing.

PLATE 65

Fig. 529. Cyrpoptus belfragei, hind legs.
Fig. 530. Phyllosceltis atra, fore legs.
Fig. 531. Fitchiella melichari, fore legs.
Fig. 532. Traxus fulvus, hind legs.
Fig. 533. Issus servillei, hind legs.
Fig. 534. Picumna ovatipennis, hind legs.
Fig. 535. Issomorphus maculatus, hind legs.
Fig. 536. Hysteropterum punctiferum, hind legs.
Fig. 537. Thionia simplex, hind legs.
Fig. 538. Oliarius quinquelineatus, hind legs.
Fig. 539. Myndus radicis, hind legs.
Fig. 540. Stobæra pallida, hind legs.
Fig. 541. Copiocerus irroratus, hind legs.

Fig. 542. Pentagramma vittatifrons, hind legs.
Fig. 543. Bostæra nasuta, hind legs.
Fig. 544. Bakerella maculata, hind legs.
Fig. 545. Laccocera vittipennis, hind legs.
Fig. 546. Phyllodinus nervatus, fore legs.
Fig. 547. Phyllodinus nervatus, hind legs.
Fig. 548. Macrotomella carinata, hind legs.
Fig. 549. Criomorphus conspicuus, hind legs.
Fig. 550. Liburniella ornata, hind legs.
Fig. 551. Saccharosydne saccharivorus, hind legs.
Fig. 552. Stenocranus arundineus, hind legs.
Fig. 553. Prokelisia setigera, hind legs.
Fig. 554. Kelisia axialis, hind legs.
Fig. 555. Megamelanus terminalis, hind legs.
Fig. 556. Pissonotus quadripustulatus, hind legs.
Fig. 557. Liburnia shermani, hind legs.

PLATE 66

Fig. 558. Acanalonia fasciata, female genitalia.
Fig. 559. Acanalonia bivittata, female genitalia.
Fig. 560. Dictyophara microrhina, female genitalia.
Fig. 561. Dictyophara, recurva, female genitalia.
Fig. 562. Dictyophara florens, female genitalia.
Fig. 563. Dictyophara lingula, female genitalia.
Fig. 564. Oliarus cinnamomeus, male genitalia.
Fig. 565. Oliarus humilis, male genitalia.
Fig. 566. Oliarus montanus, male genitalia.
Fig. 567. Oliarus placitus, male genitalia.
Fig. 568. Oliarus difficilis, male genitalia.
Fig. 569. Oliarus franciscanus, male genitalia.
Fig. 570. Oliarus aridus, male genitalia.
Fig. 571. Oliarus quinquelineatus, male genitalia.
Fig. 572. Oliarus texanus, male genitalia.
Fig. 573. Oliarus vittatus, male genitalia.
Fig. 574. Oliarus vitreus, male genitalia.
Fig. 575. Oliarus vicarius, male genitalia.
Fig. 576. Microledrida fulva, male genitalia.
Fig. 577. Microledrida asperta, male genitalia.
Fig. 578. Cixius apicalis, male genitalia.
Fig. 579. Cixius stigmatus, male genitalia.
Fig. 580. Cixius misellus, male genitalia.
Fig. 581. Cixius colœpium, male genitalia.
Fig. 582. Cixius basalis, male genitalia.
Fig. 583. Cixius pini, male genitalia.
Fig. 584. Bothriocera undata, male genitalia.
Fig. 585. Bothriocera drakei, male genitalia.

Fig. 586. Bothriocera tinealis, male genitalia.
Fig. 587. Oecleus decens, male genitalia.
Fig. 588. Oecleus productus, male genitalia.
Fig. 589. Oecleus fulvidorsum, male genitalia.

PLATE 67

Fig. 590. Oecleus lineatus, male genitalia.
Fig. 591. Oecleus obtusus, male genitalia.
Fig. 592. Oecleus borealis, male genitalia.
Fig. 593. Myndus fulvus, male genitalia.
Fig. 594. Myndus slossoni, male genitalia.
Fig. 595. Myndus radicis, male genitalia.
Fig. 596. Myndus enotatus, male genitalia.
Fig. 597. Myndus viridis, male genitalia.
Fig. 598. Myndus pusillus, male genitalia.
Fig. 599. Myndus pictifrons, male genitalia.
Fig. 600. Myndus truncatus, male genitalia.
Fig. 601. Myndus sordidipennis, male genitalia.
Fig. 602. Myndus delicatus, male genitalia.
Fig. 603. Otiocerus degeerii, male genitalia.
Fig. 604. Otiocerus abbotii, male genitalia.
Fig. 605. Otiocerus amyotii, male genitalia.
Fig. 606. Otiocerus coquebertii, male genitalia.
Fig. 607. Amalopota uhleri, male genitalia.
Fig. 608. Anotia burnetii, male genitalia.
Fig. 609. Anotia bonnetii, male genitalia.
Fig. 610. Anotia westwoodi, male genitalia.
Fig. 611. Anotia sayi, male genitalia.
Fig. 612. Anotia kirkaldyi, male genitalia.
Fig. 613. Neocenchrea heidemanni, male genitalia.
Fig. 614. Phaciocephalus fulvus, male genitalia.
Fig. 615. Phaciocephalus uhleri, male genitalia.
Fig. 616. Herpis maculata, male genitalia.
Fig. 617. Herpis edentula, male genitalia.
Fig. 618. Herpis vulgaris, male genitalia.
Fig. 619. Herpis incisa, male genitalia.
Fig. 620. Herpis australis, male genitalia.
Fig. 621. Herpis obscura, male genitalia.

PLATE 68

Fig. 622. Stobæra pallida, male genitalia.
Fig. 623. Stobæra concinna, male genitalia.
Fig. 624. Stobæra tricarinata, male genitalia.
Fig. 625. Stobæra minuta, male genitalia.
Fig. 626. Copiocerus irroratus, male genitalia.
Fig. 627. Pentagramma minore, male genitalia.

Fig. 628. Pentagramma vittatifrons, male genitalia.
Fig. 629. Bostæra nasuta, male genitalia.
Fig. 630. Bakerella maculata, male genitalia.
Fig. 631. Laccocera vittipennis, male genitalia.
Fig. 632. Laccocera zonata, male genitalia.
Fig. 633. Phyllodinus nervatus, male genitalia.
Fig. 634. Phyllodinus flabellatus, male genitalia.
Fig. 635. Criomorphus conspicuus, male genitalia.
Fig. 636. Liburniella ornata, male genitalia.
Fig. 637. Saccharosydne saccharivorus, male genitalia.
Fig. 638. Stenocranus similis, male genitalia.
Fig. 639. Stenocranus similis, female genitalia.
Fig. 640. Stenocranus arundineus, male genitalia.
Fig. 641. Stenocranus arundineus, female genitalia.
Fig. 642. Stenocranus vittatus, male genitalia.
Fig. 643. Stenocranus dorsalis, male genitalia.
Fig. 644. Stenocranus dorsalis, female genitalia.
Fig. 645. Megamelus palaetus, male genitalia.
Fig. 646. Megamelus inflatus, male genitalia.
Fig. 647. Megamelus longicornis, male genitalia (after Dozier).
Fig. 648. Megamelus notulus, male genitalia (after Crawford).
Fig. 649. Megamelus distinctus, male genitalia.
Fig. 650. Megamelus æstus, male genitalia.
Fig. 651. Megamelus uncus, male genitalia.
Fig. 652. Megamelus anticostus, male genitalia.
Fig. 653. Megamelus angulatus, male genitalia.

PLATE 69

Fig. 654. Megamelus davisi, male genitalia.
Fig. 655. Megamelus piceus, male genitalia.
Fig. 656. Prokelisia marginata, male genitalia.
Fig. 657. Prokelisia setigera, male genitalia.
Fig. 658. Kelisia axialis, male genitalia.
Fig. 659. Kelisia crocea, male genitalia.
Fig. 660. Kelisia parvula, male genitalia.
Fig. 661. Megamelanus terminalis, male genitalia.
Fig. 662. Megamelanus lautus, male genitalia.
Fig. 663. Megamelanus elongatus, male genitalia.
Fig. 664. Megamelanus dorsalis, male genitalia.
Fig. 665. Megamelanus spartini, male genitalia.
Fig. 666. Peregrinus maidis, male genitalia.
Fig. 667. Pissonotus quadripustulatus, male genitalia.
Fig. 668. Pissonotus aphidioides, male genitalia.
Fig. 669. Pissonotus brunneus, male genitalia.
Fig. 670. Pissonotus dorsalis, male genitalia.
Fig. 671. Pissonotus ater, male genitalia.

Fig. 672. Pissonotus marginatus, male genitalia.
Fig. 673. Pissonotus pallipes, male genitalia.
Fig. 674. Pissonotus crawfordi, male genitalia.
Fig. 675. Pissonotus guttatus, male genitalia.
Fig. 676. Pissonotus basalis, male genitalia.
Fig. 677. Pissonotus delicatus, male genitalia.
Fig. 678. Pissonotus fulvus, male genitalia.
Fig. 679. Pissonotus nigridorsum, male genitalia.
Fig. 680. Pissonotus speciosus, male genitalia.
Fig. 681. Liburnia lutulenta, male genitalia.
Fig. 682. Liburnia obscurella, male genitalia (after Melichar).
Fig. 683. Liburnia analis, male genitalia.
Fig. 684. Liburnia campestris, male genitalia.
Fig. 685. Liburnia rotundata, male genitalia.

PLATE 70

Fig. 686. Liburnia shermani, male genitalia.
Fig. 687. Liburnia occlusa, male genitalia.
Fig. 688. Liburnia nigridorsum, male genitalia.
Fig. 689. Liburnia slossoni, male genitalia.
Fig. 690. Liburnia foveata, male genitalia.
Fig. 691. Liburnia constricta, male genitalia (after Crawford).
Fig. 692. Liburnia osborni, male genitalia.
Fig. 693. Liburnia gillettei, male genitalia.
Fig. 694. Liburnia lineatipes, male genitalia.
Fig. 695. Liburnia pellucida, male genitalia.
Fig. 696. Liburnia consimilis, male genitalia.
Fig. 697. Liburnia kilmani, male genitalia.
Fig. 698. Liburnia waldeni, male genitalia.
Fig. 699. Liburnia basivitta, male genitalia.
Fig. 700. Liburnia magnistyla, male genitalia.
Fig. 701. Liburnia albolineosa, male genitalia.
Fig. 702. Liburnia triloba, male genitalia.
Fig. 703. Liburnia gerhardi, male genitalia.
Fig. 704. Liburnia alexanderi, male genitalia.
Fig. 705. Liburnia fulvidorsum, male genitalia.
Fig. 706. Liburnia staminata, male genitalia.
Fig. 707. Liburnia humilis, male genitalia.
Fig. 708. Liburnia detecta, male genitalia.
Fig. 709. Liburnia unda, male genitalia.
Fig. 710. Liburnia tuckeri, male genitalia.
Fig. 711. Liburnia lateralis, male genitalia.
Fig. 712. Liburnia teapea, male genitalia.
Fig. 713. Liburnia vanduzeei, male genitalia (after Crawford).
Fig. 714. Liburnia laminalis, male genitalia.
Fig. 715. Liburnia puella, male genitalia.

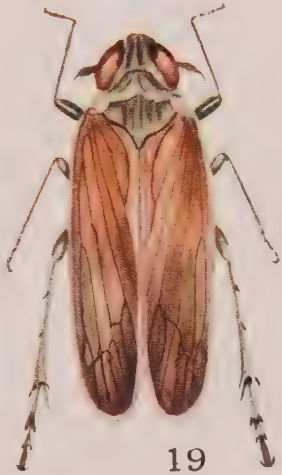
14

15

16

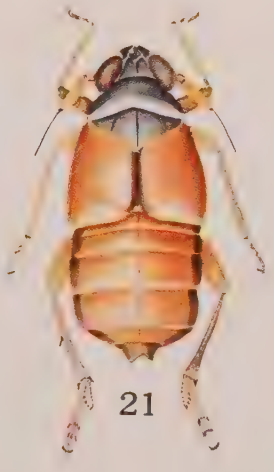
17

18

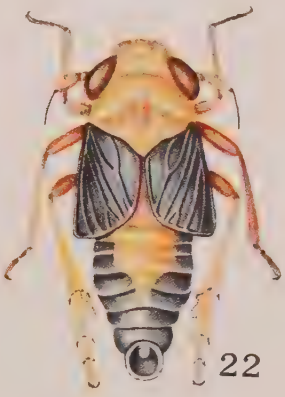


19

20

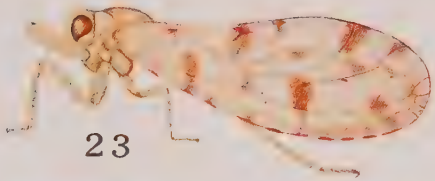


21



22

Z. P. Metcalf del.


23

24

27

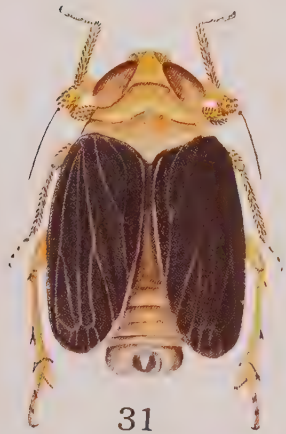
25

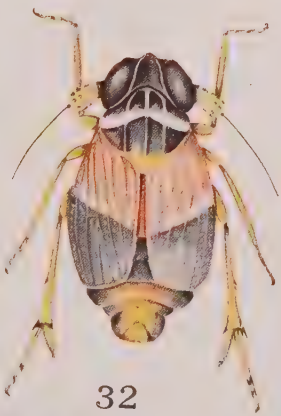
28

29

26

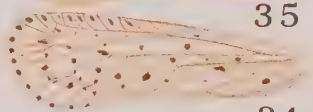
30

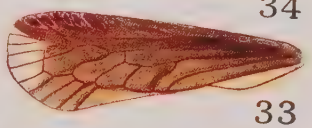

31


32

36

35


34

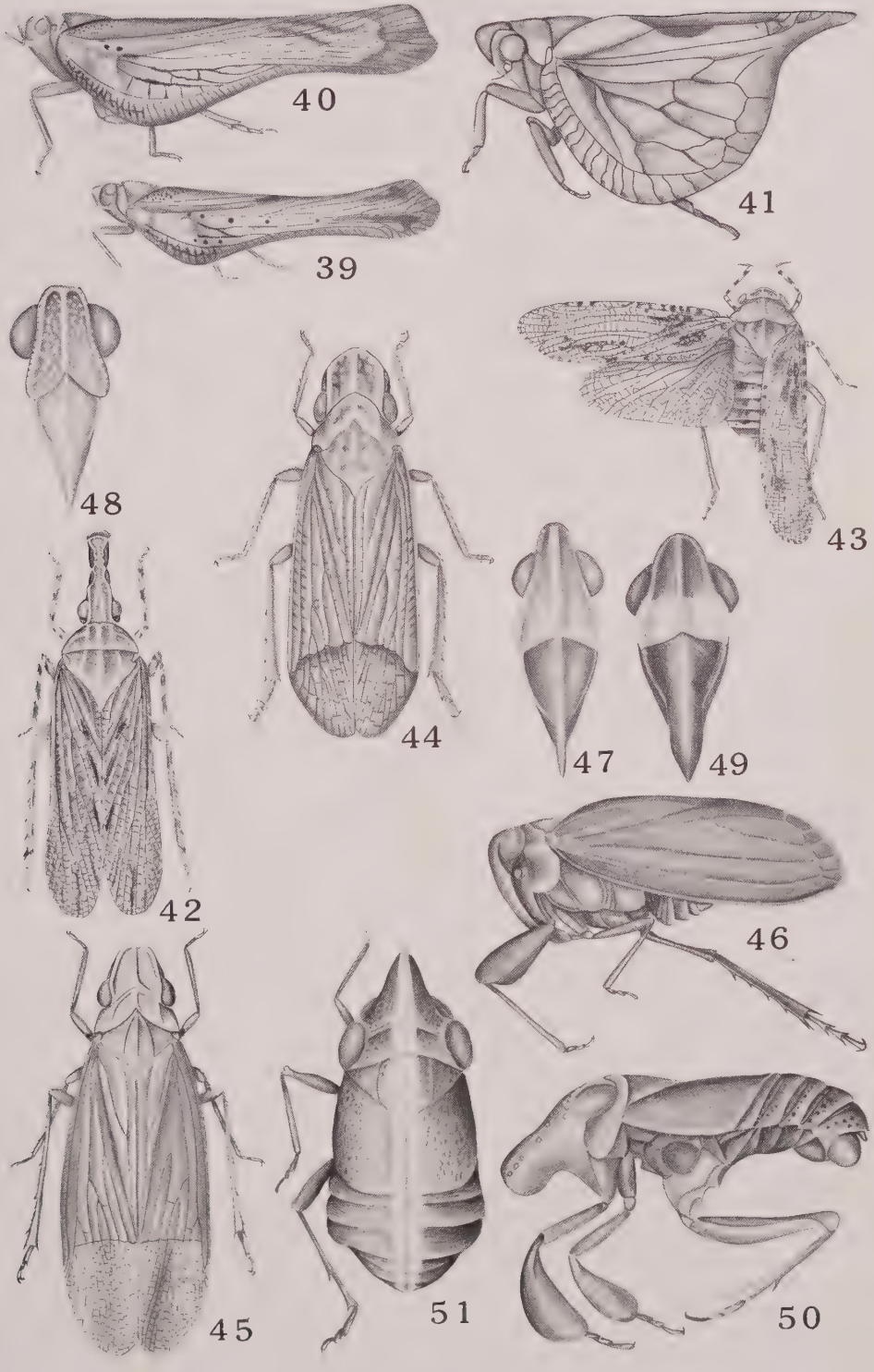

33

37

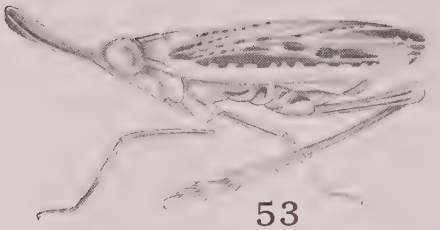
38

Z. P. Metcalf del.

PLATE 41

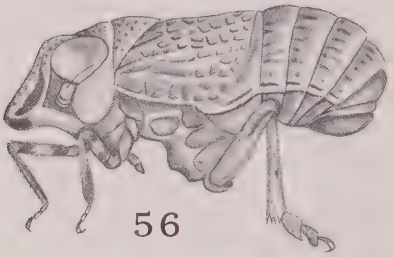


Z. P. Metcalf del.



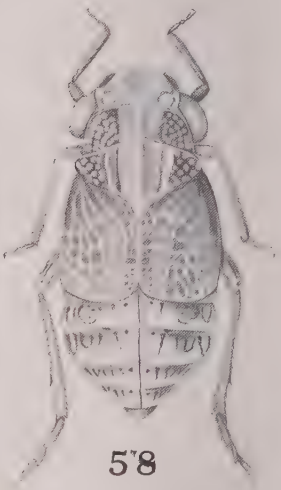
53

52

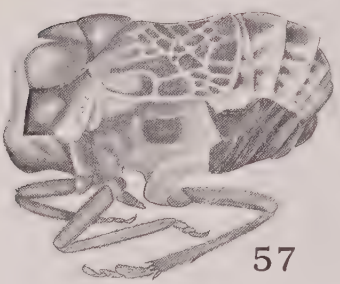


56

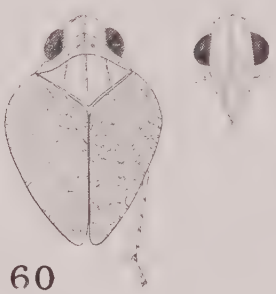
55



58

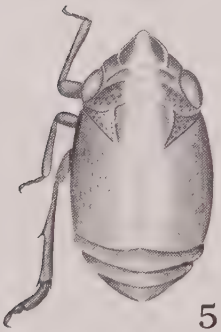


57

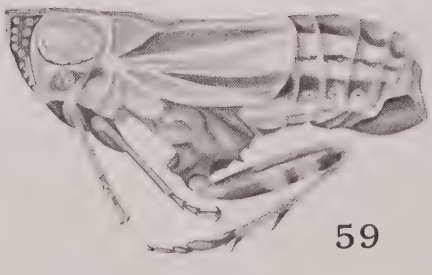


60

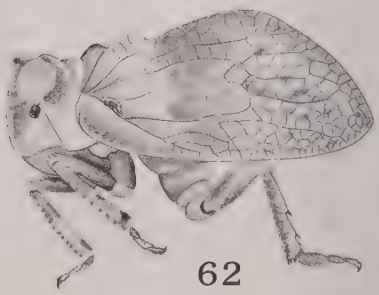
61



54



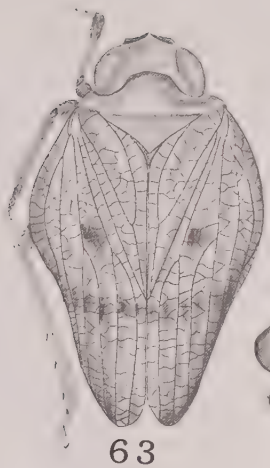
59

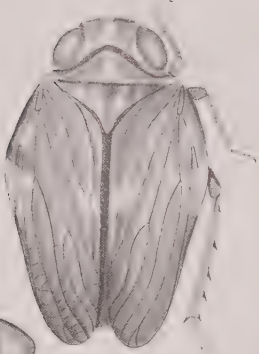


62

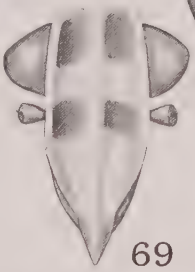
Z. P. Metcalf del

PLATE 43

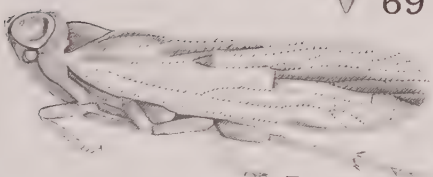

63


64

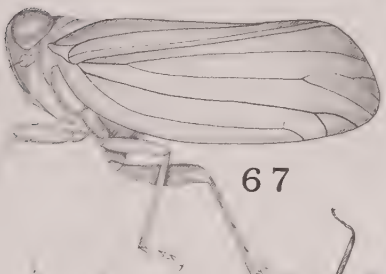
65


69

68


74

75

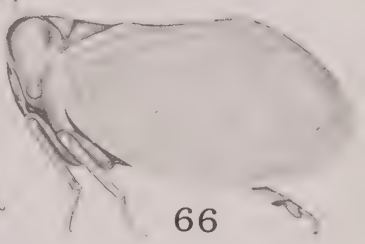

67

70

71

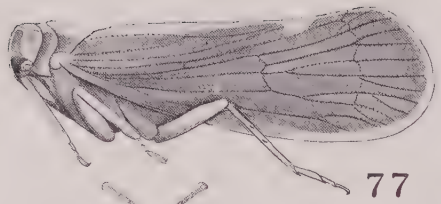
73

72

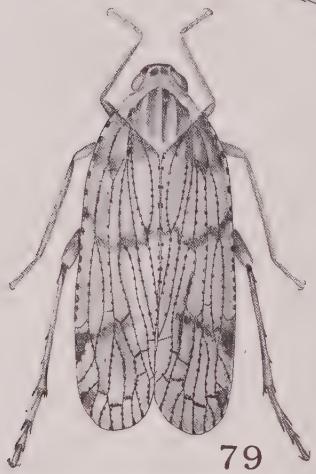

66

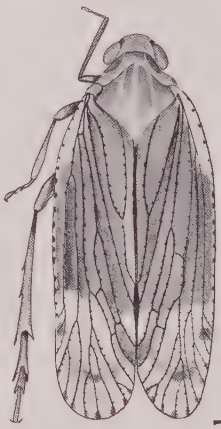
Z. P. Metcalf del.

PLATE 44

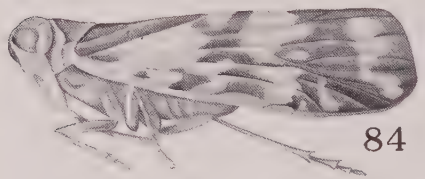

77

86

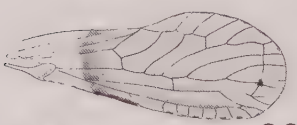

79

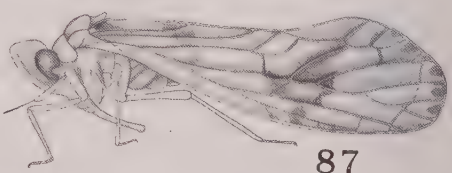

78

76

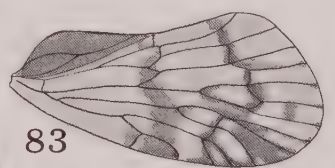

84

88


89

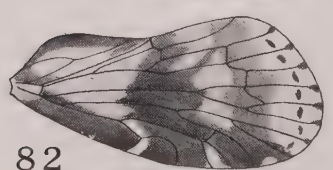

87

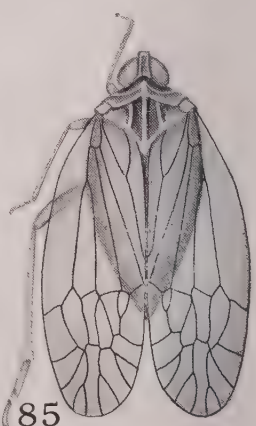
90


83

81

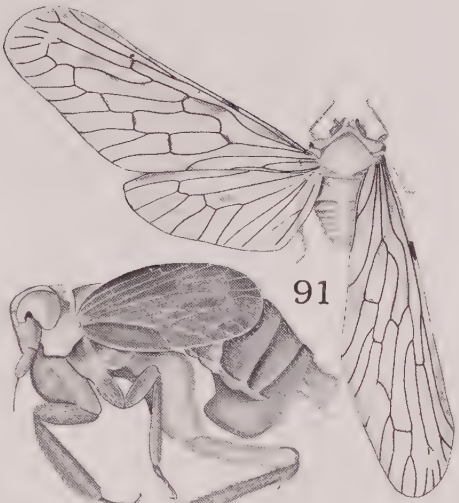
80


82

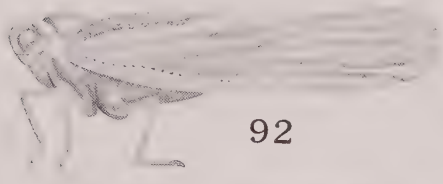

85

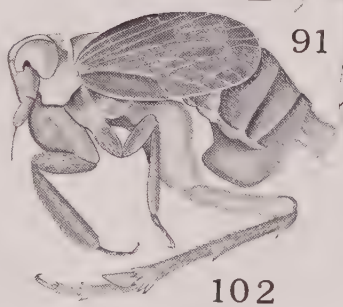
Z. P. Metcalf del

94


91

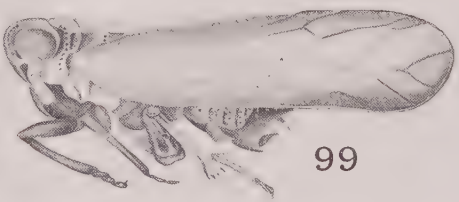
93

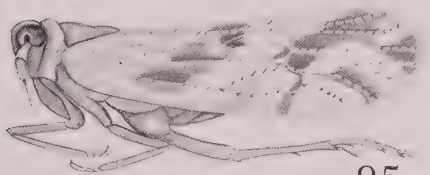

92

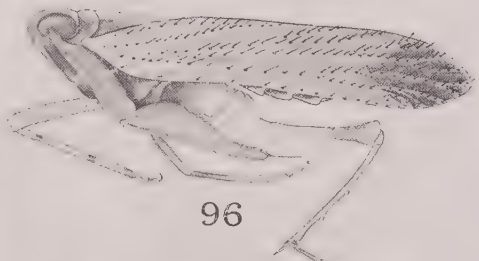

102

98

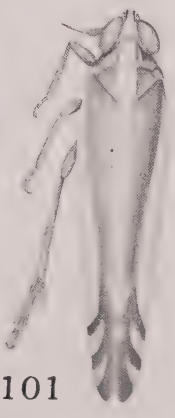
100

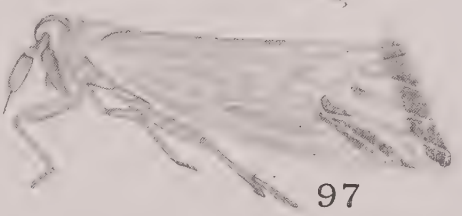

99


95


96

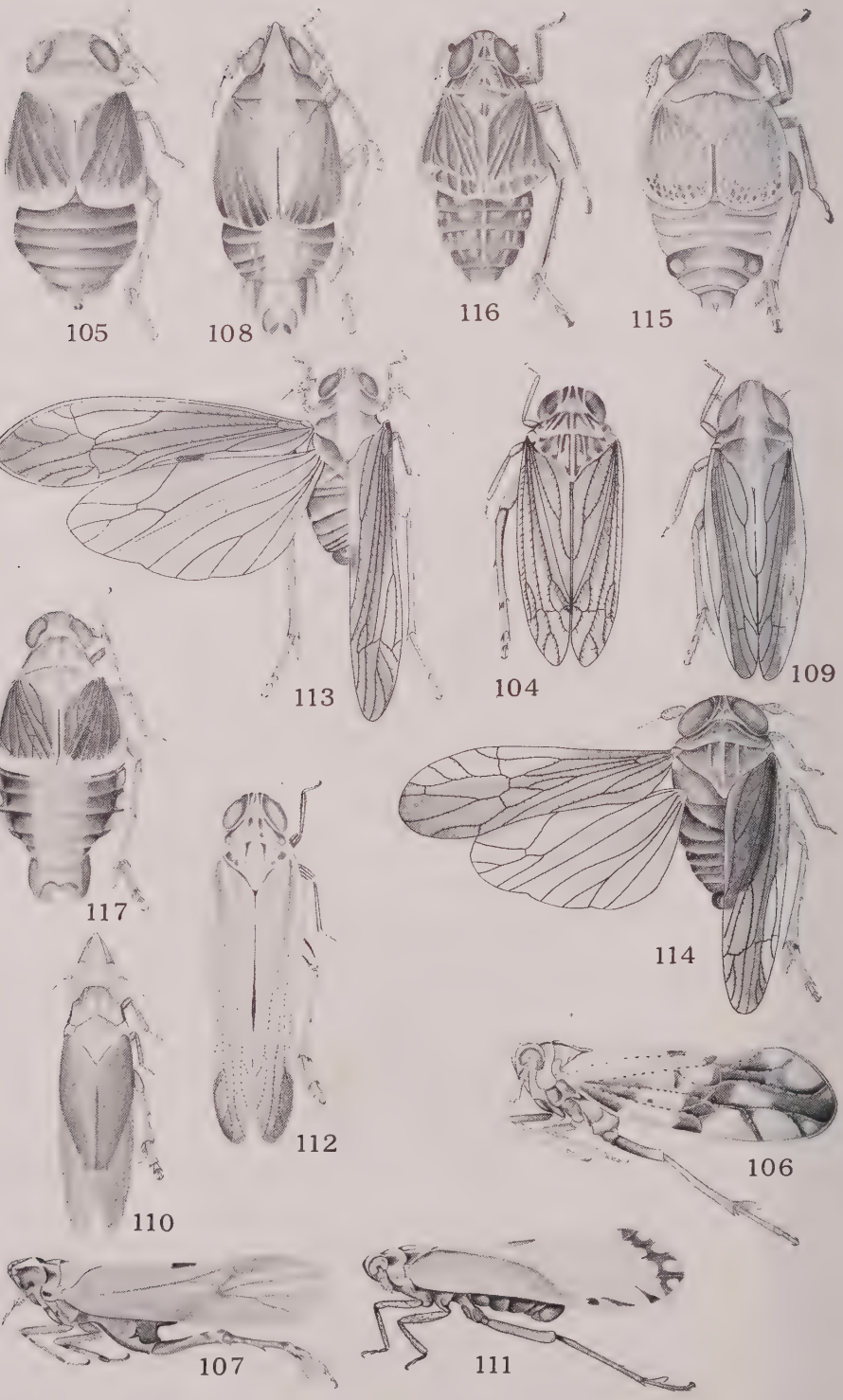
103


101


97

Z. P. Metcalf del.

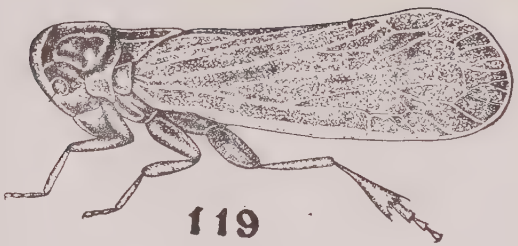
PLATE 46



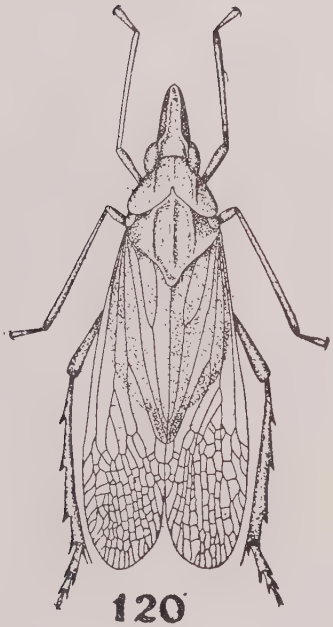
Z. P. Metcalf del.

PLATE 47

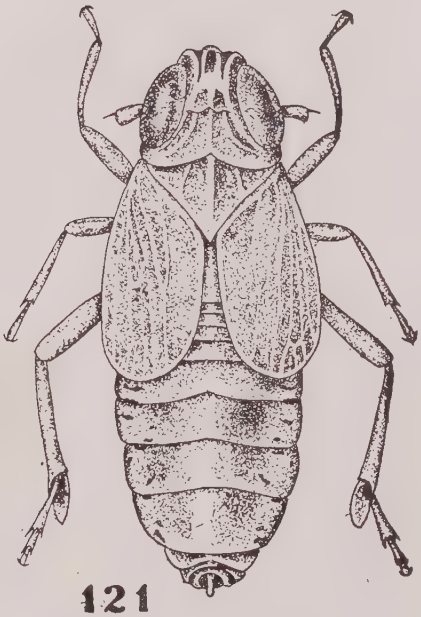
118



119

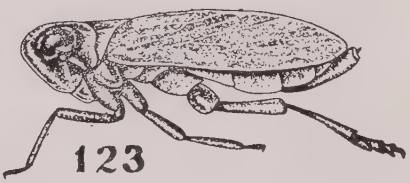


120



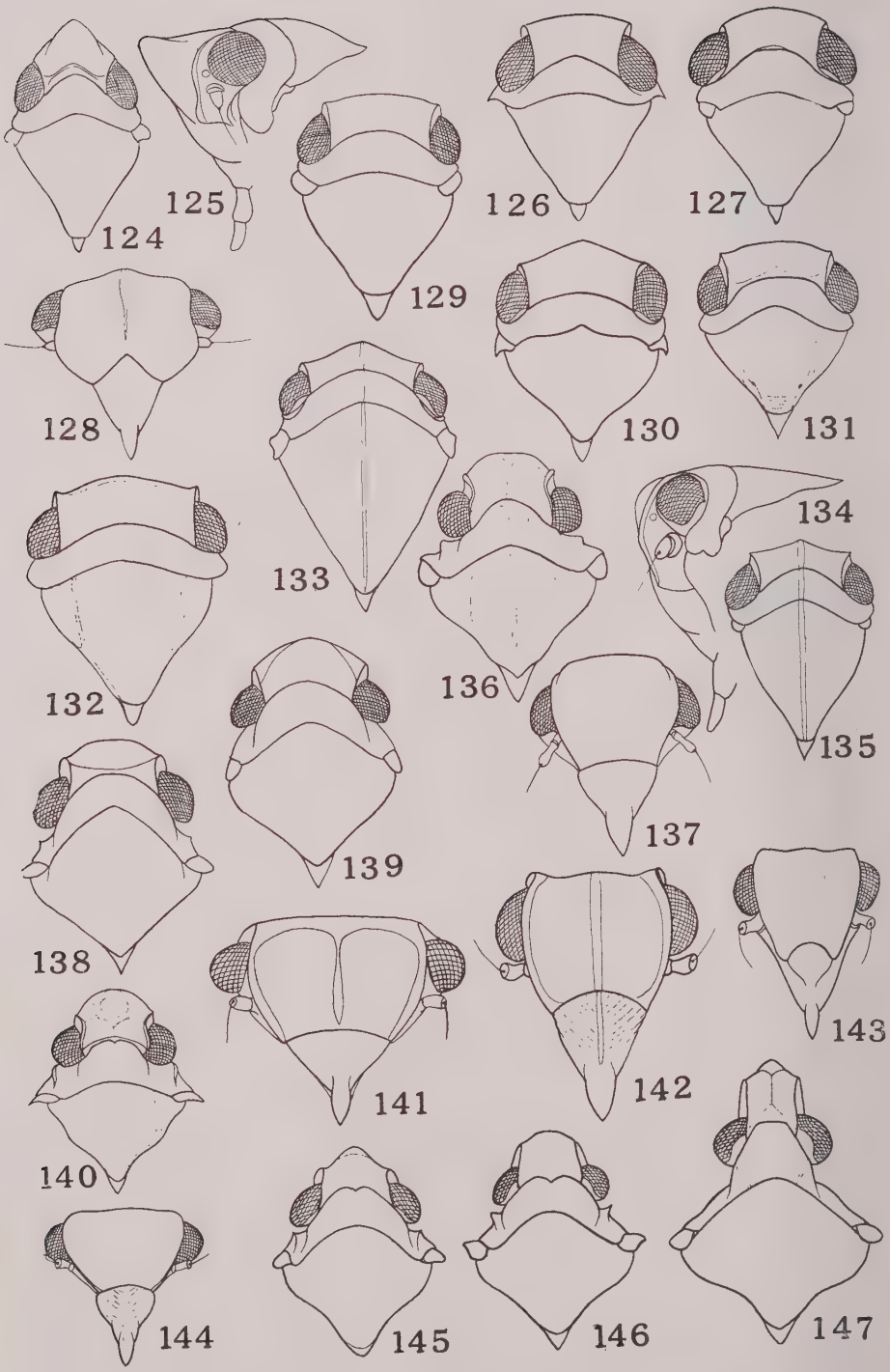
121

122



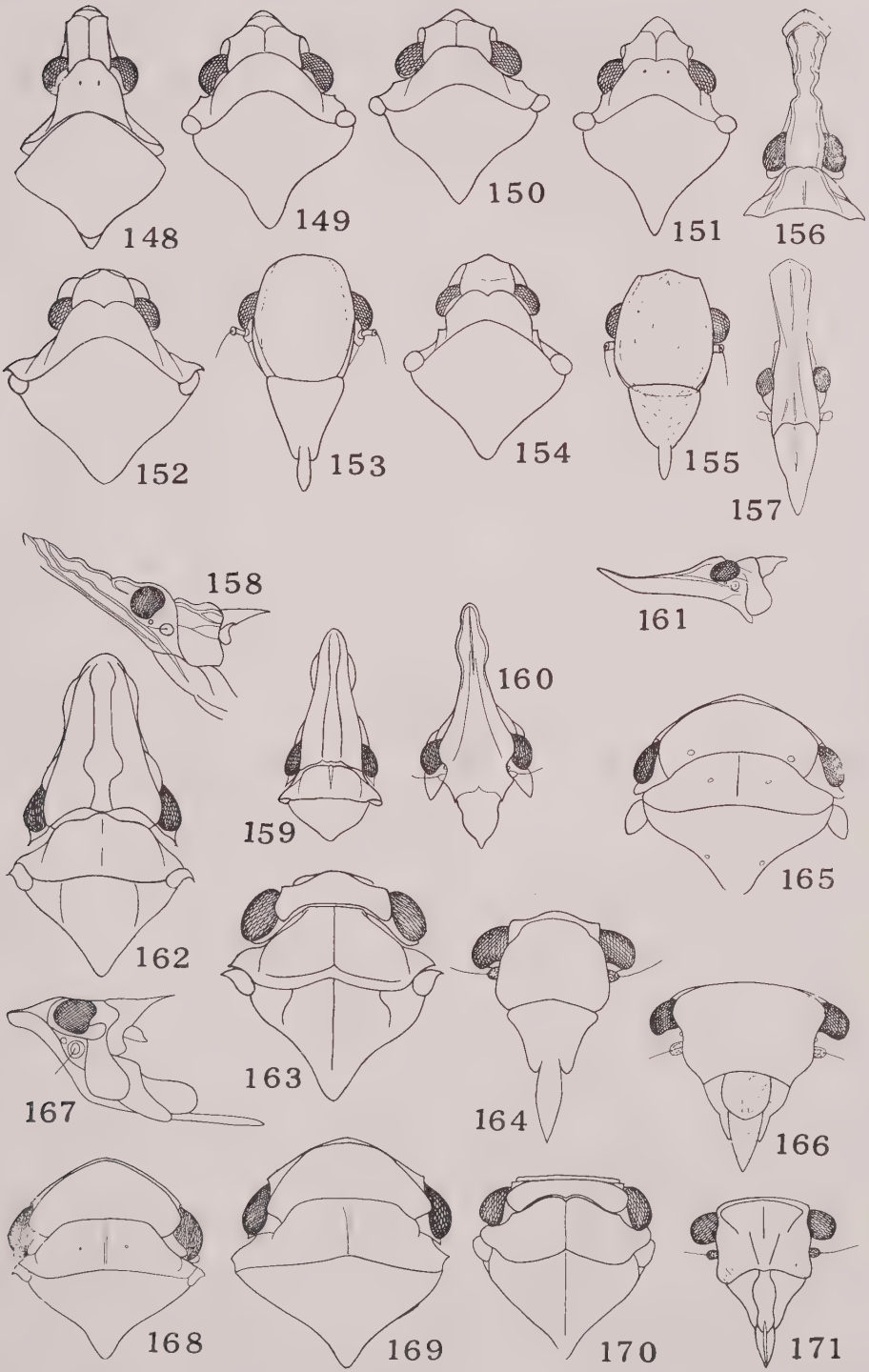
123

Z. P. Metcalf del.

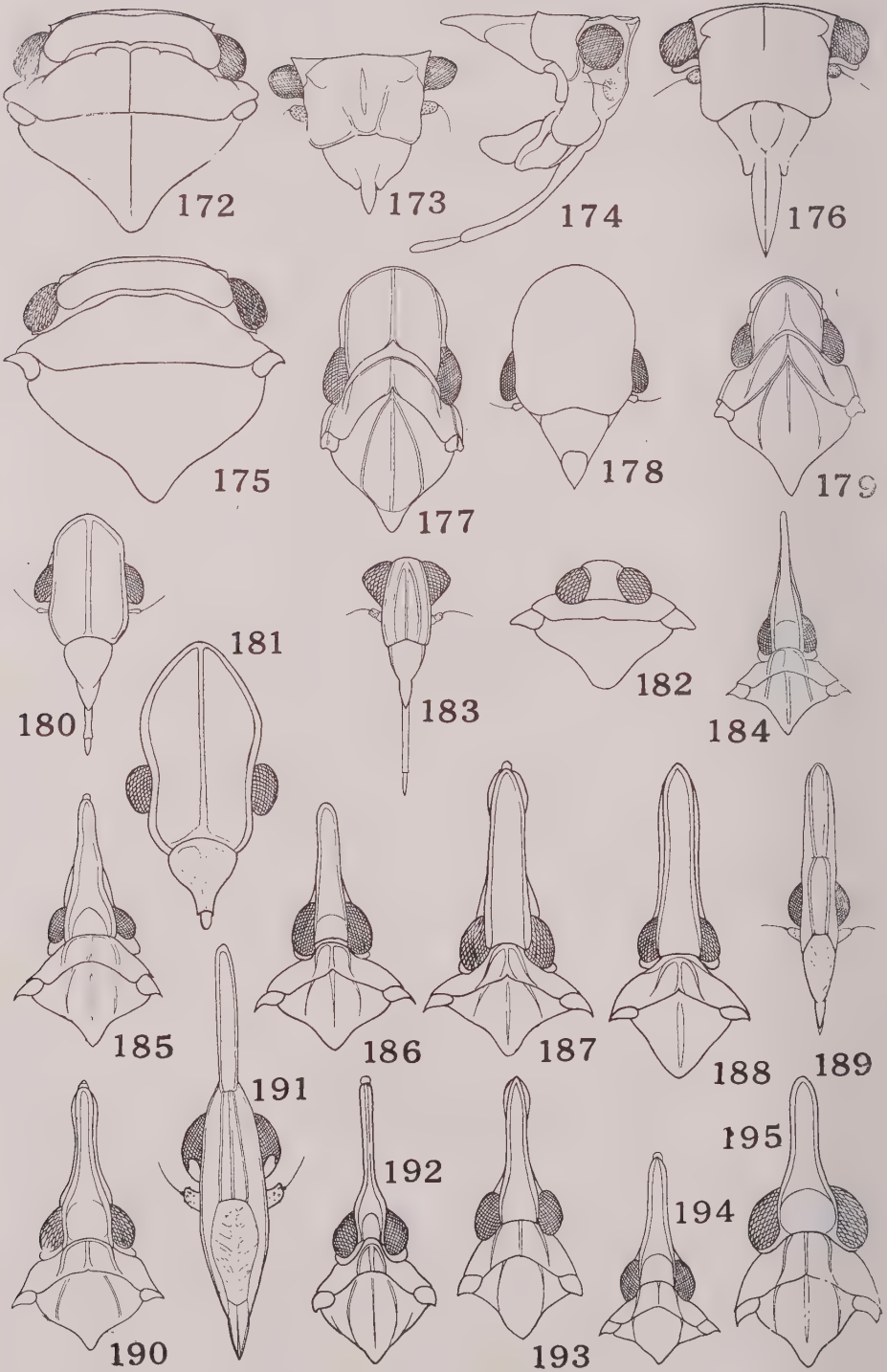


Z. P. Metcalf del.

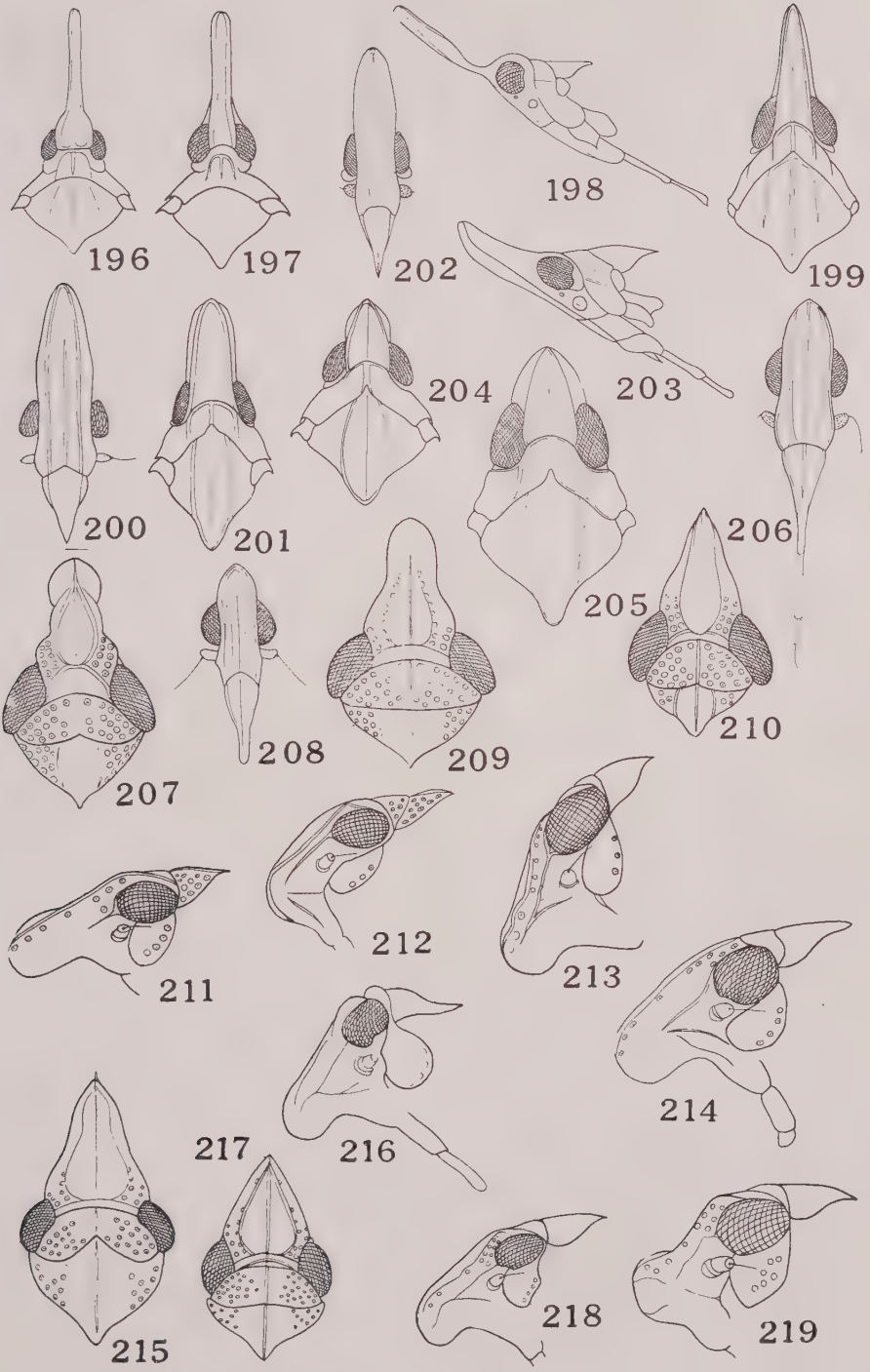
PLATE 49



Z. P. Metcalf del.

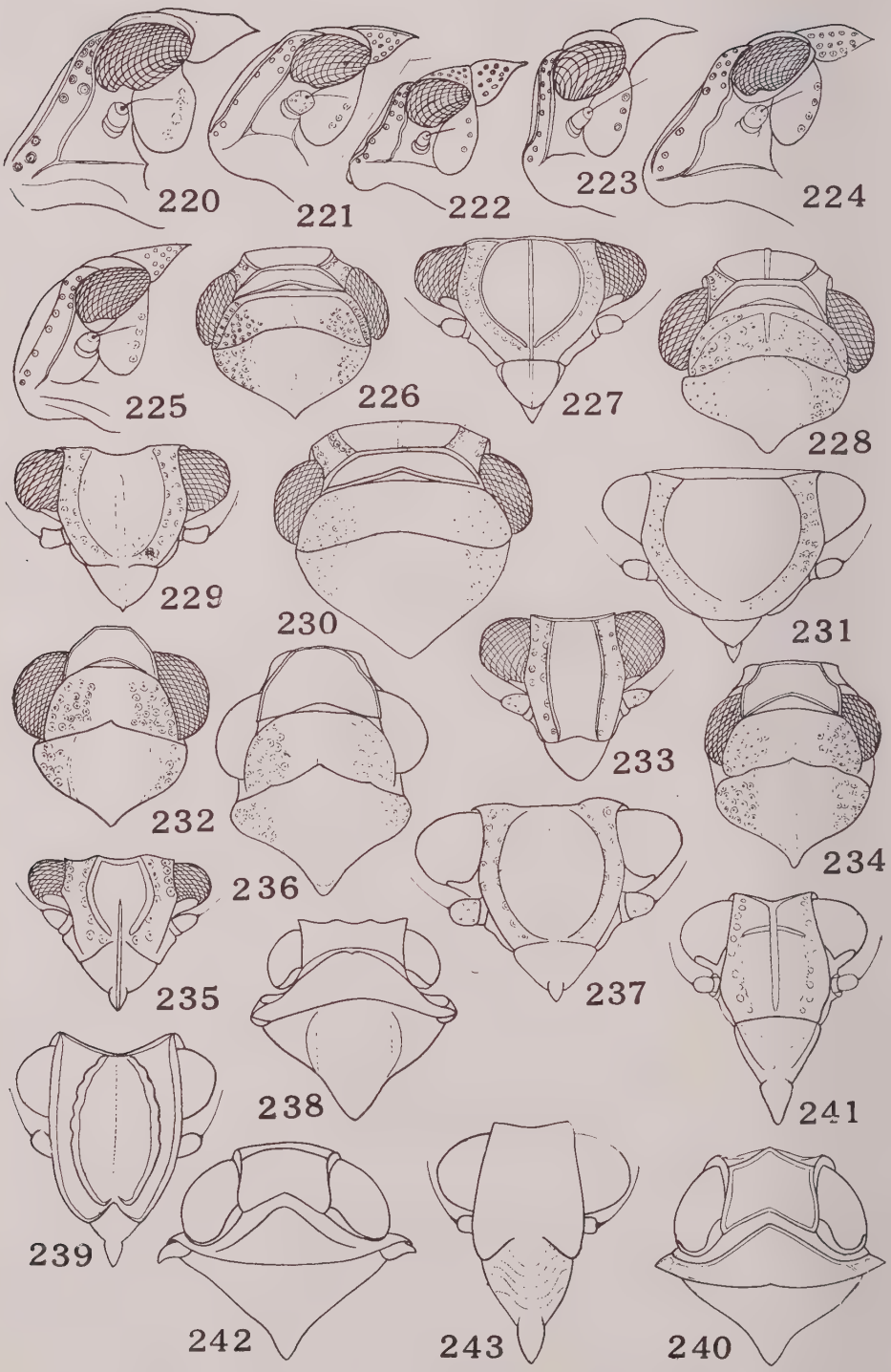


Z. P. Metcalf del.



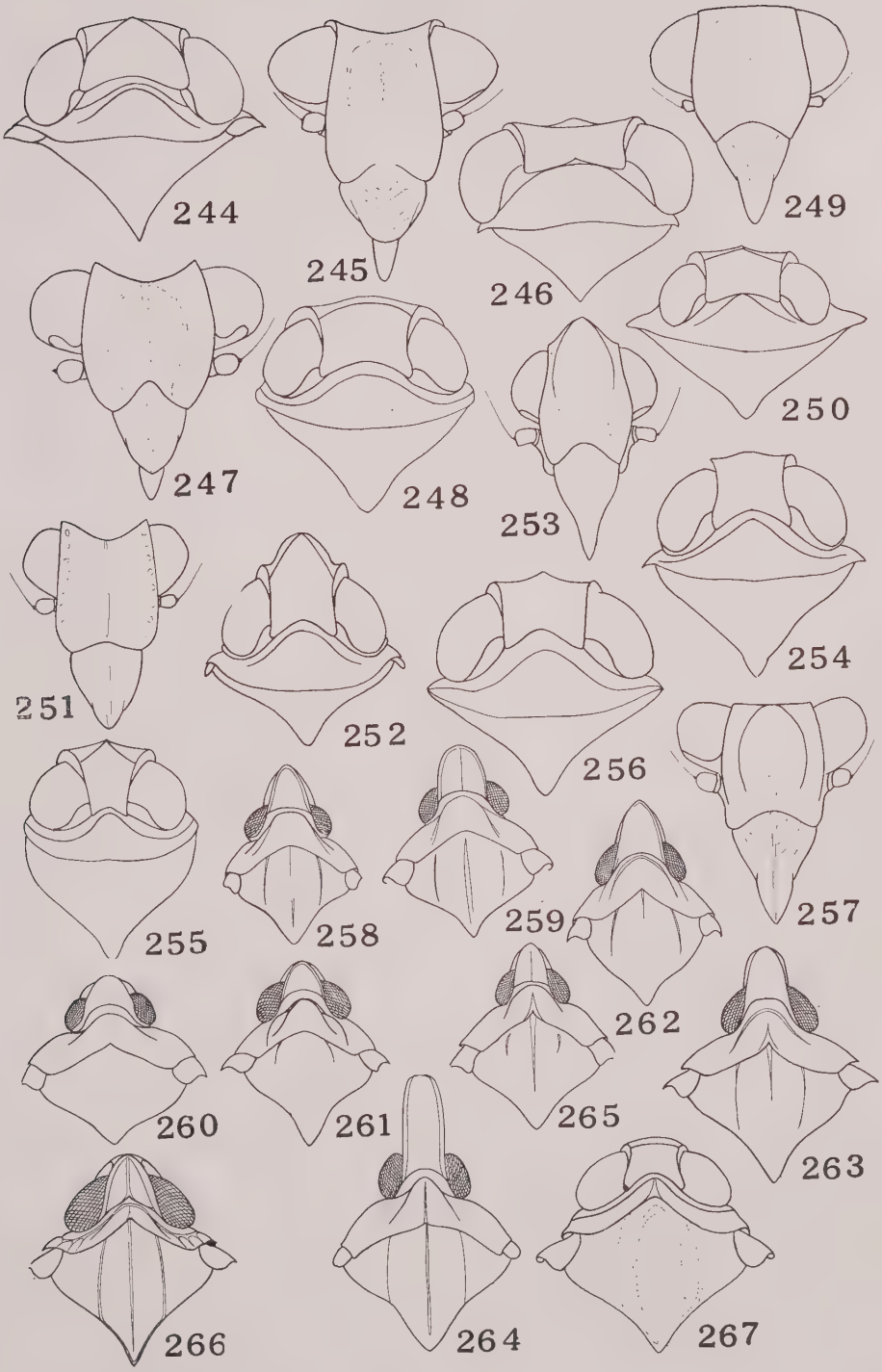
Z. P. Metcalf del.

PLATE 52

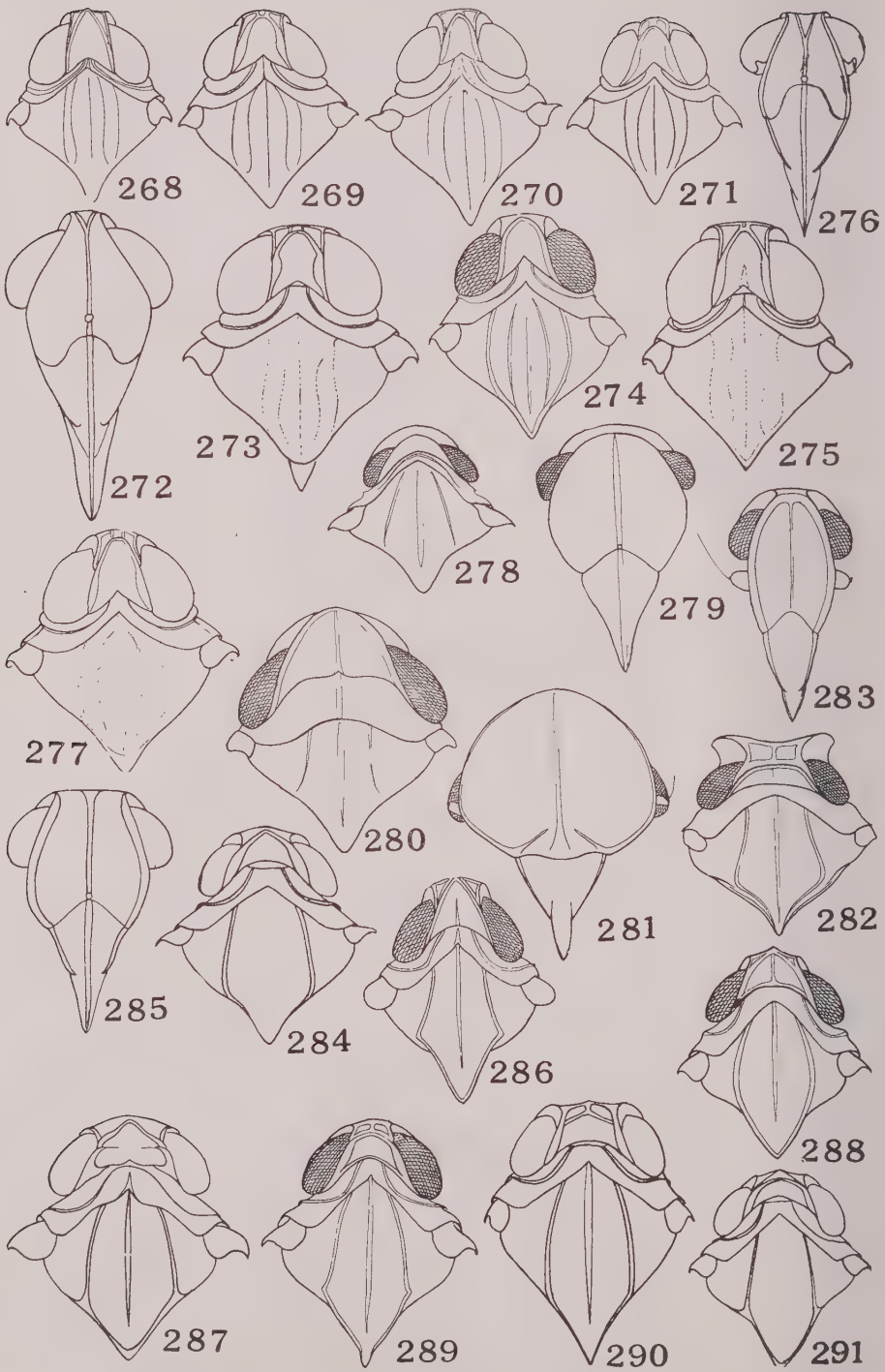


Z. P. Metcalf del.

PLATE 53

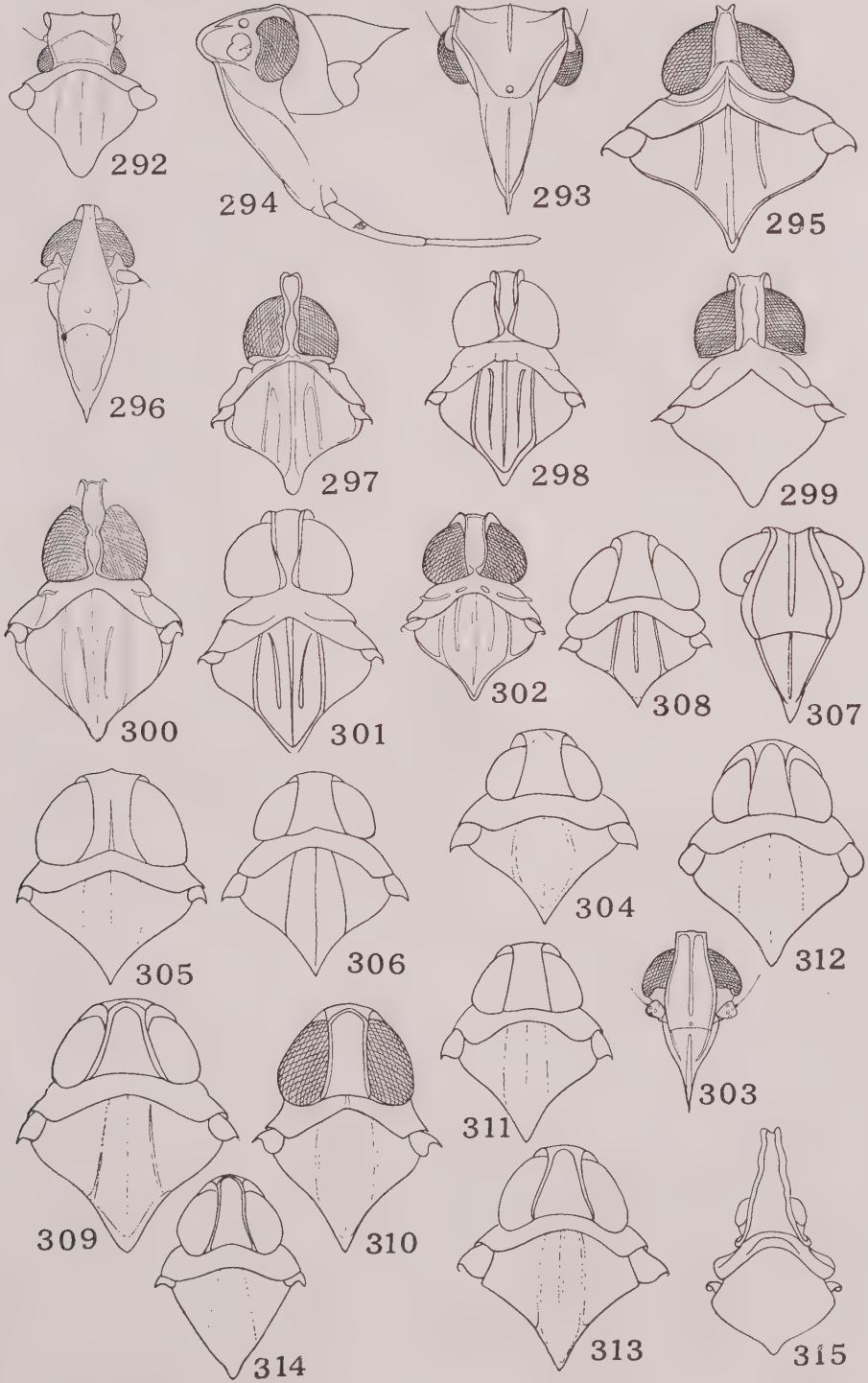


Z. P. Metcalf del.



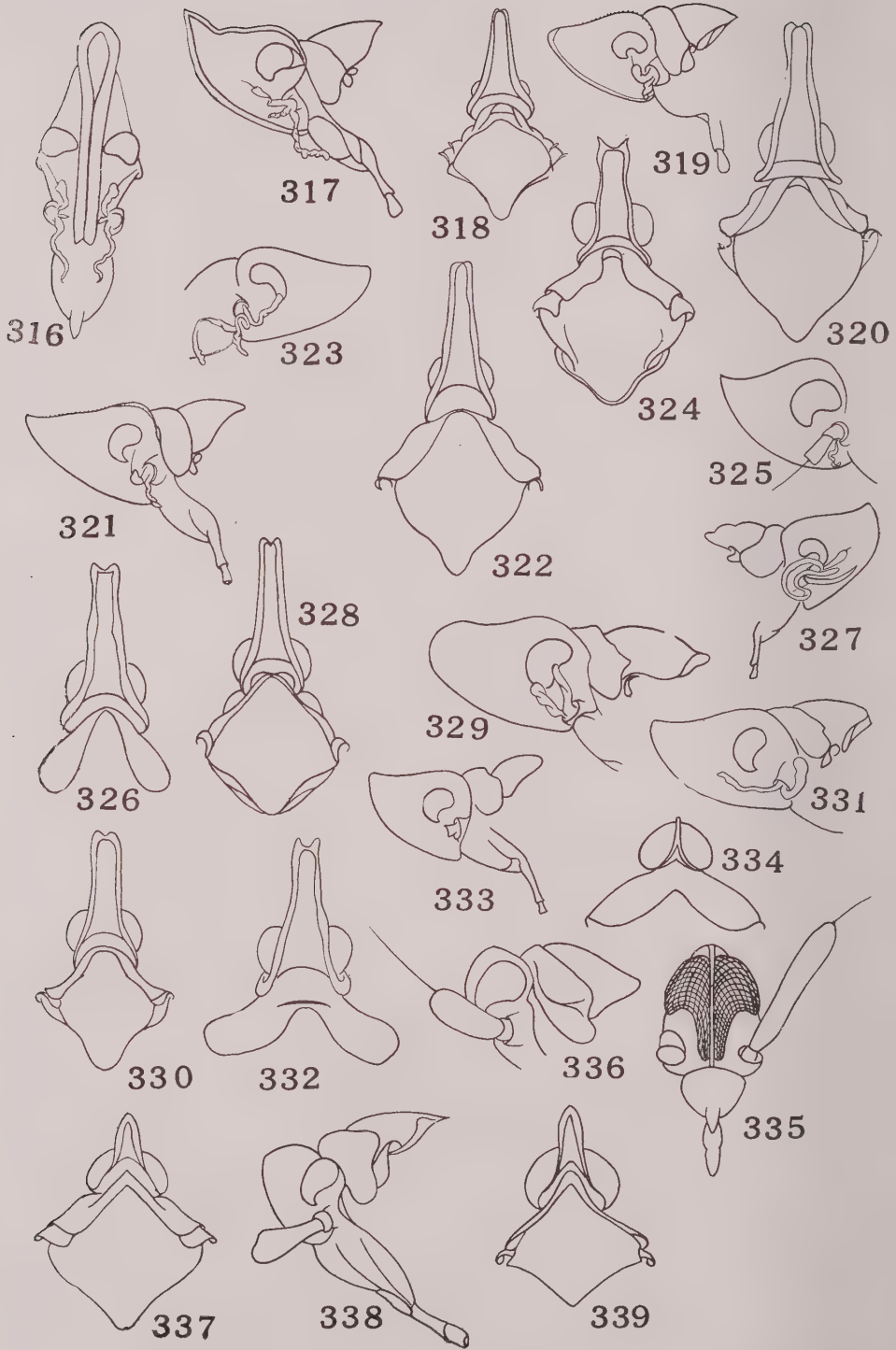
Z. P. Metcalf del.

PLATE 55

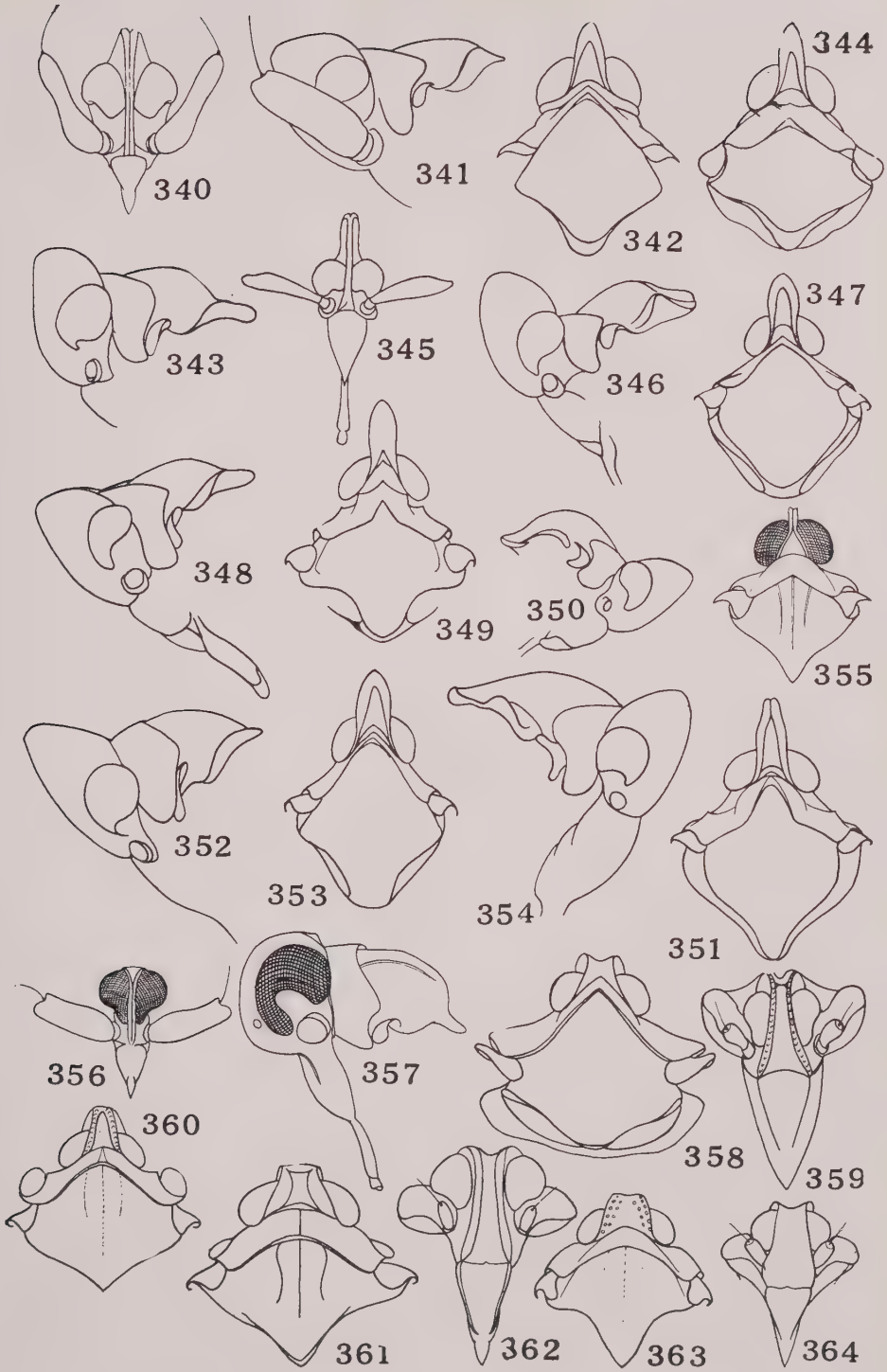


Z. P. Metcalf del.

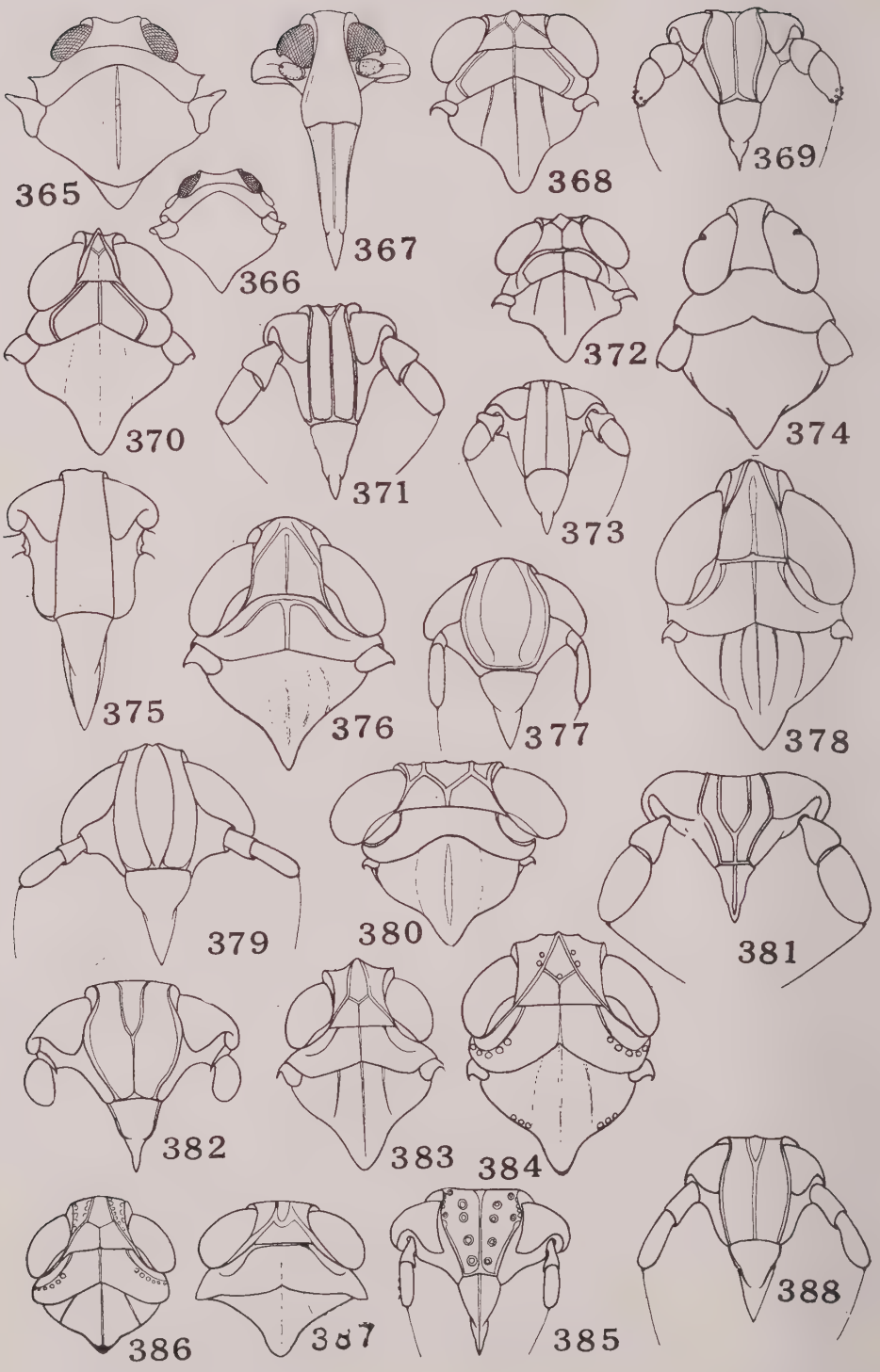
PLATE 56



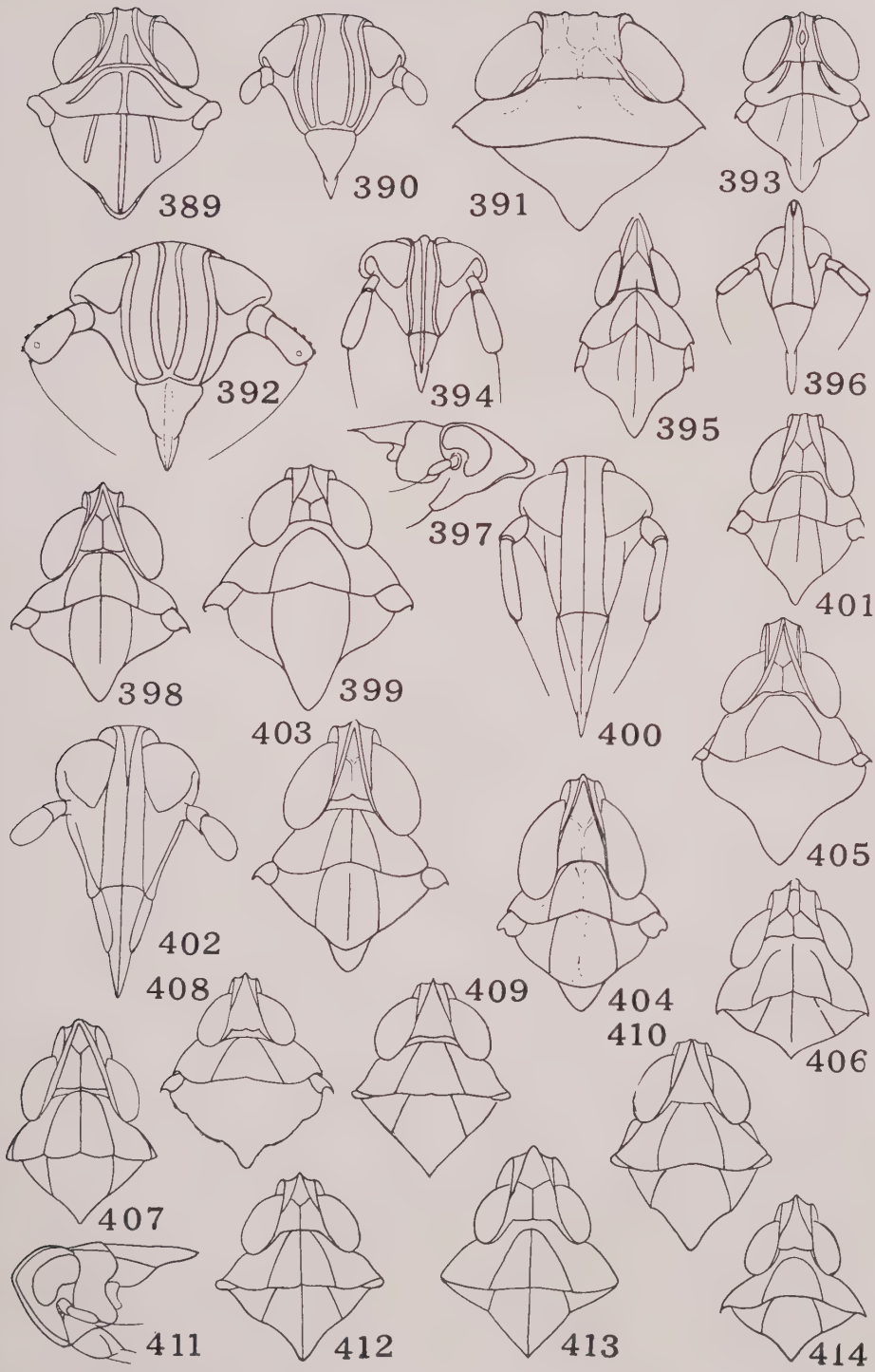
Z. P. Metcalf del.



Z. P. Metcalf del.

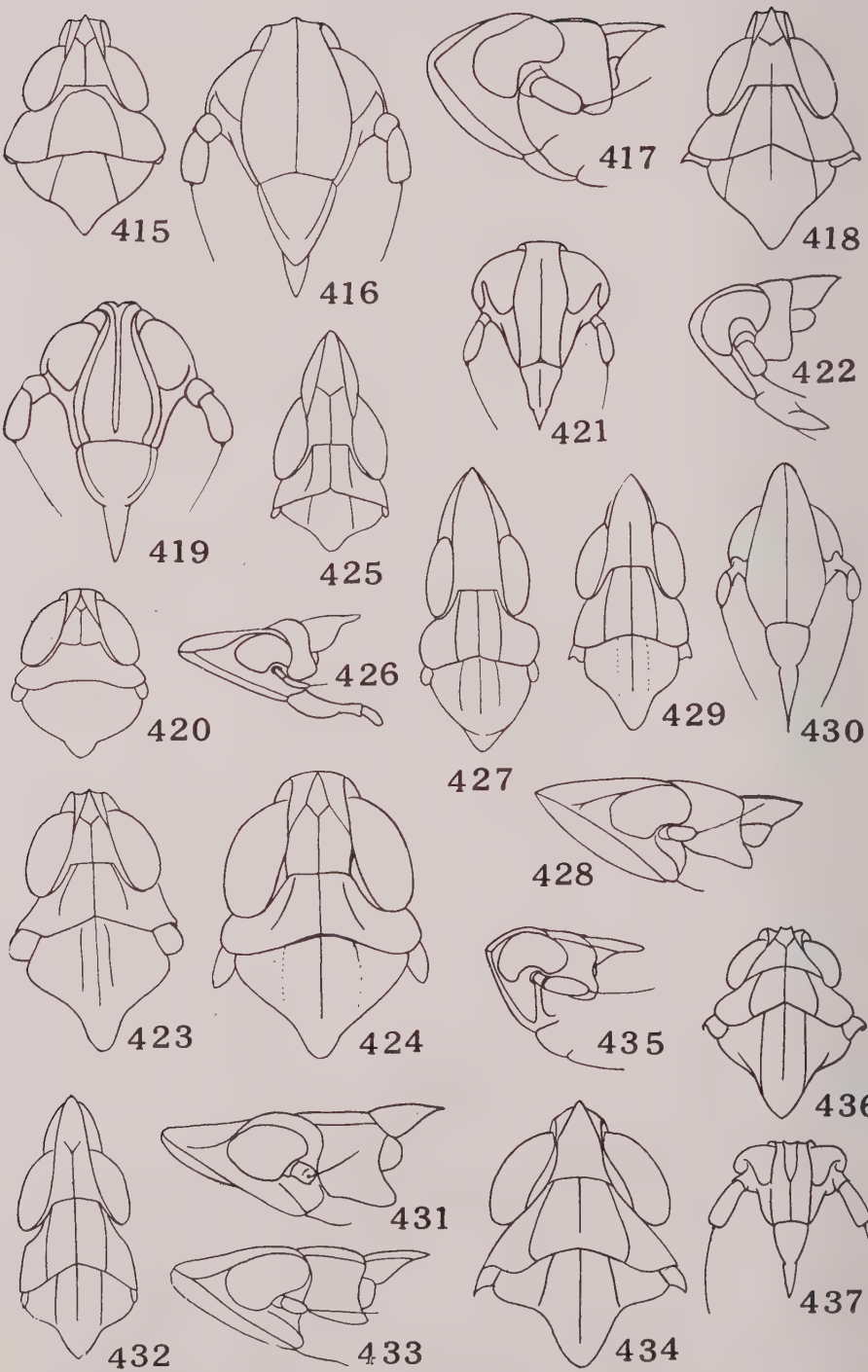


Z. P. Metcalf del.

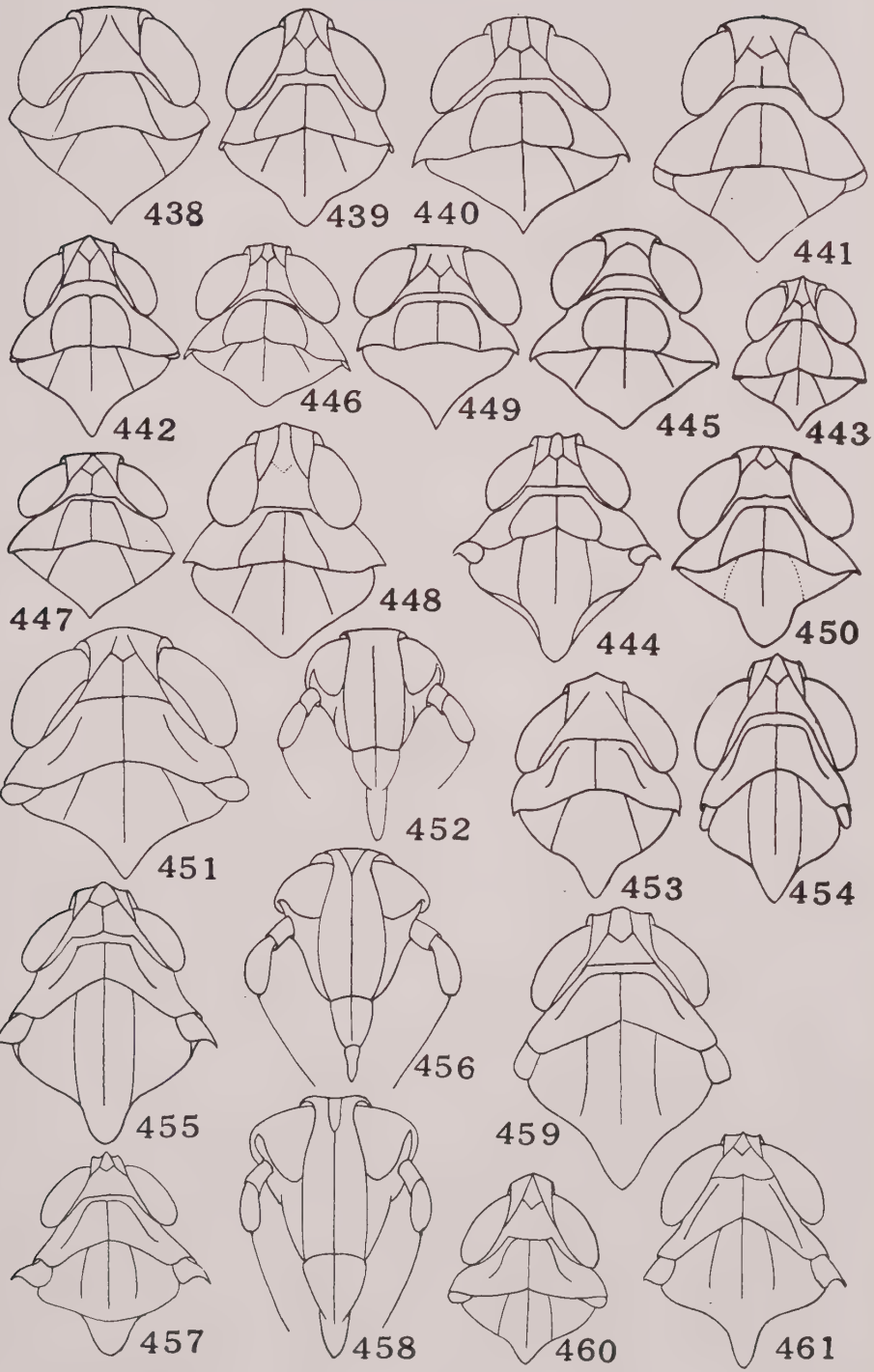


Z. P. Metcalf del.

PLATE 60

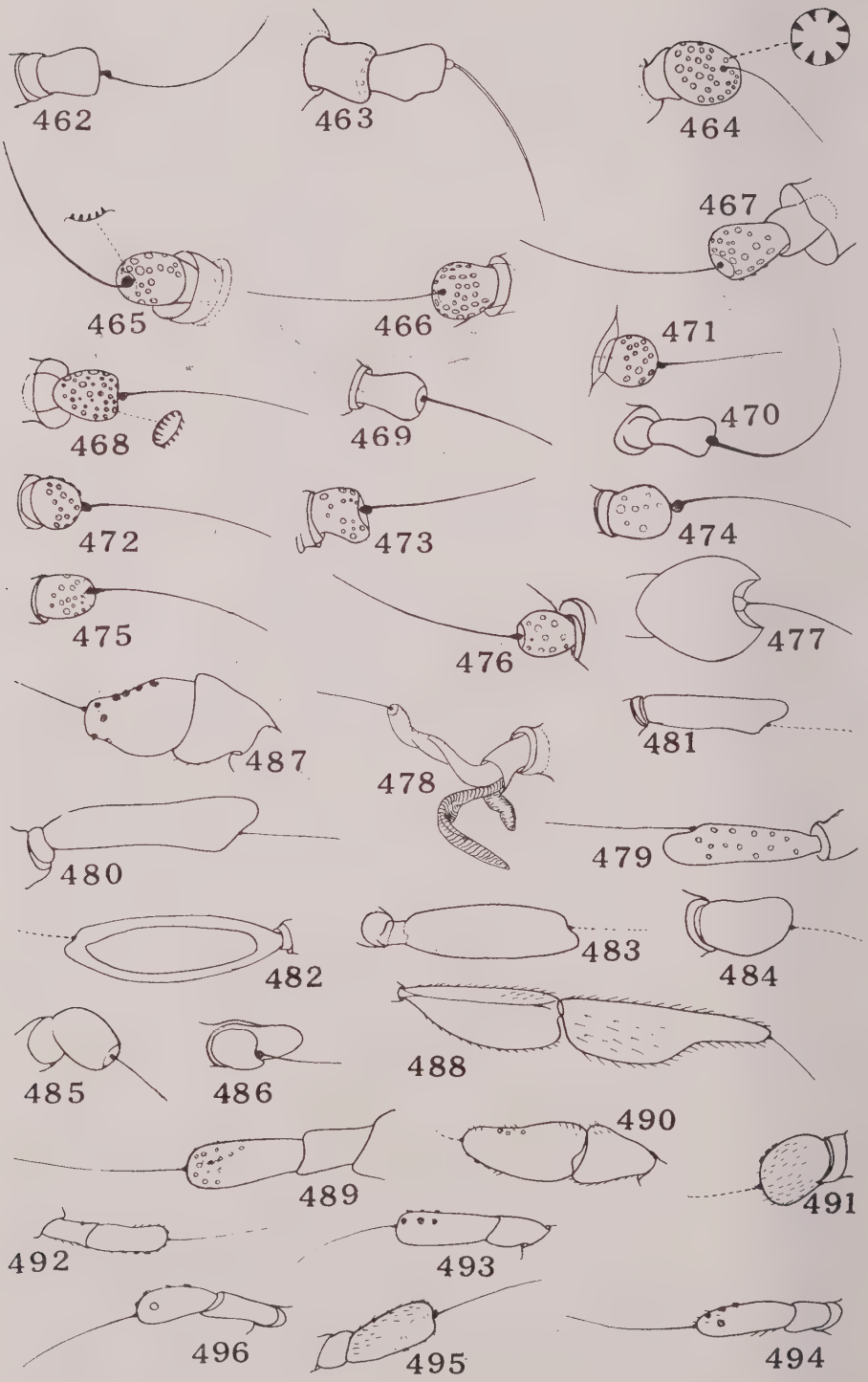


Z. P. Metcalf del.

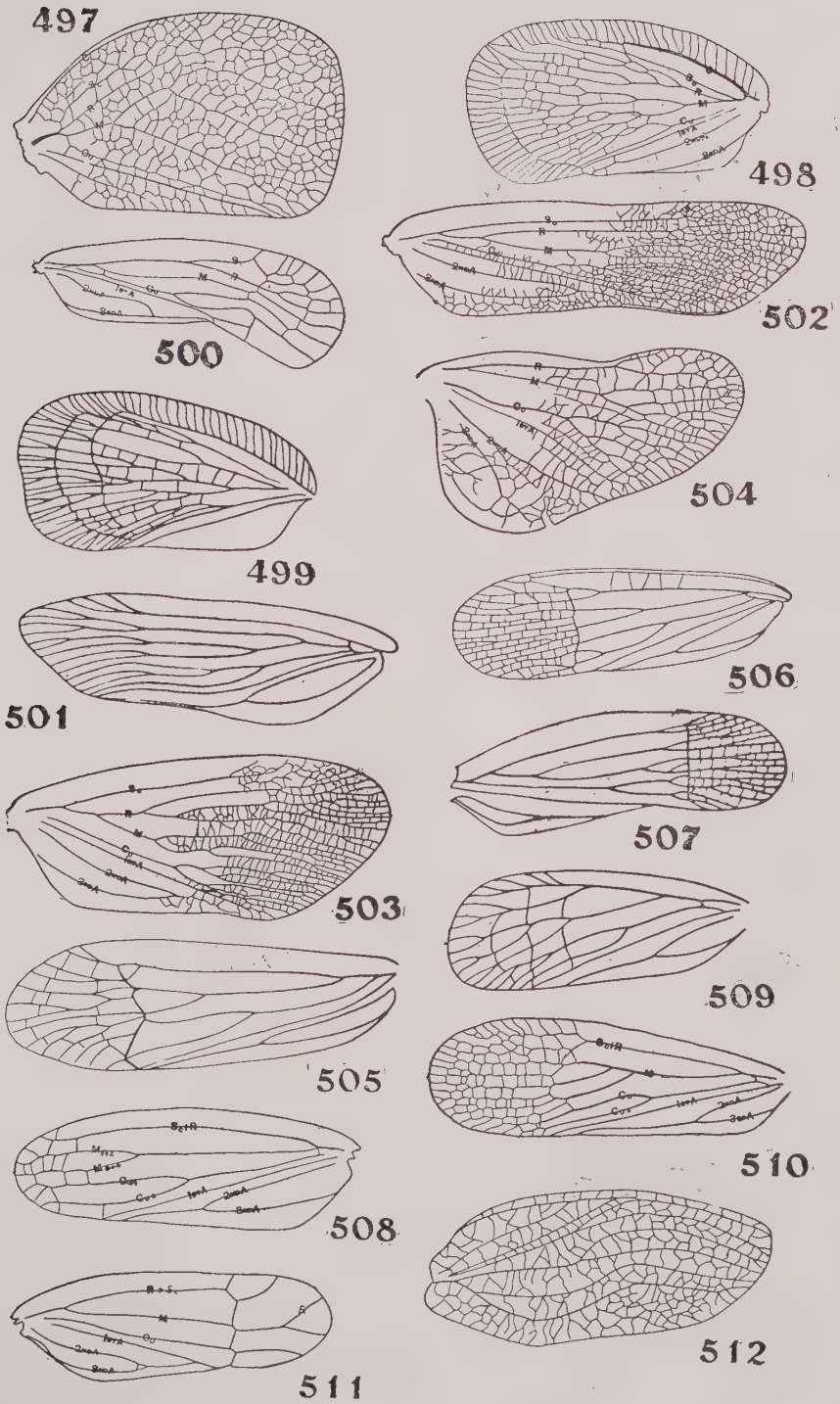


Z. P. Metcalf del.

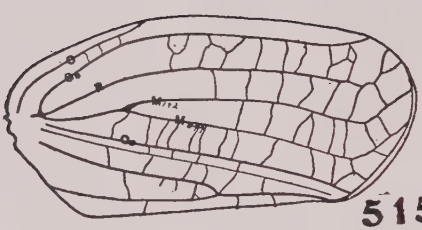
PLATE 62



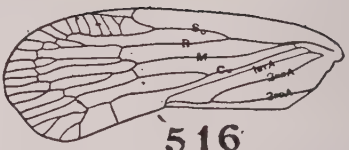
Z. P. Metcalf del.



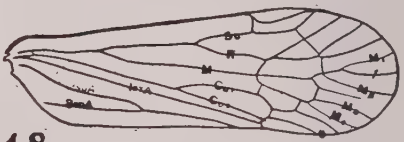
Z. P. Metcalf del.



515

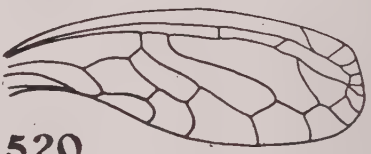


516



518

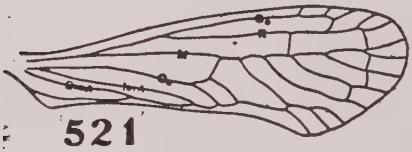
517



520

519

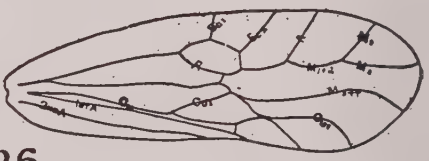
522



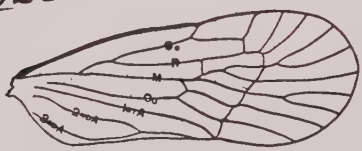
521

524

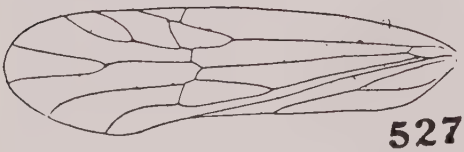
523



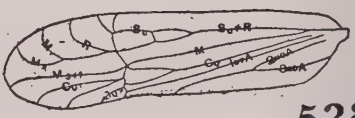
526



525



527



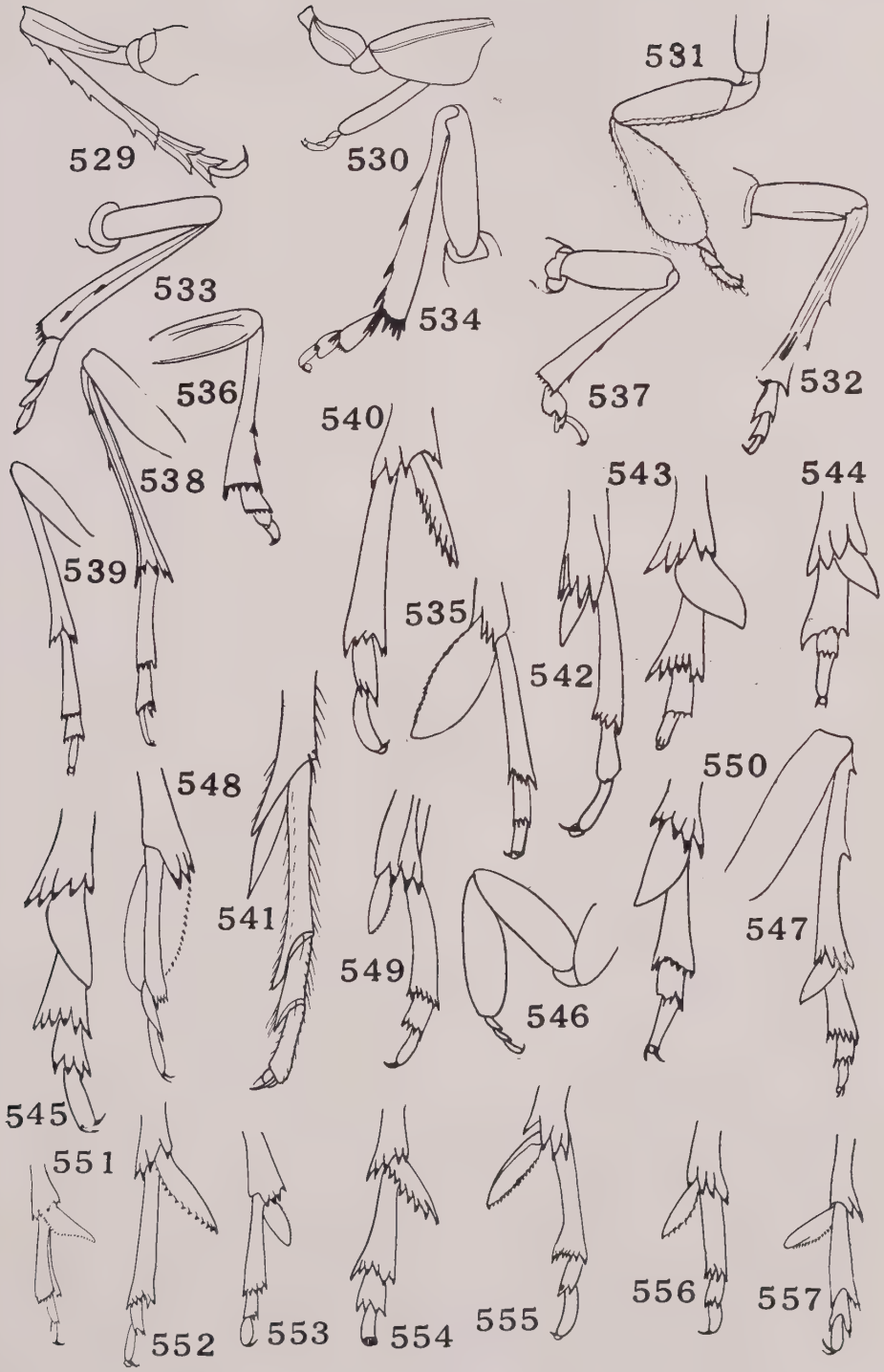
528

513

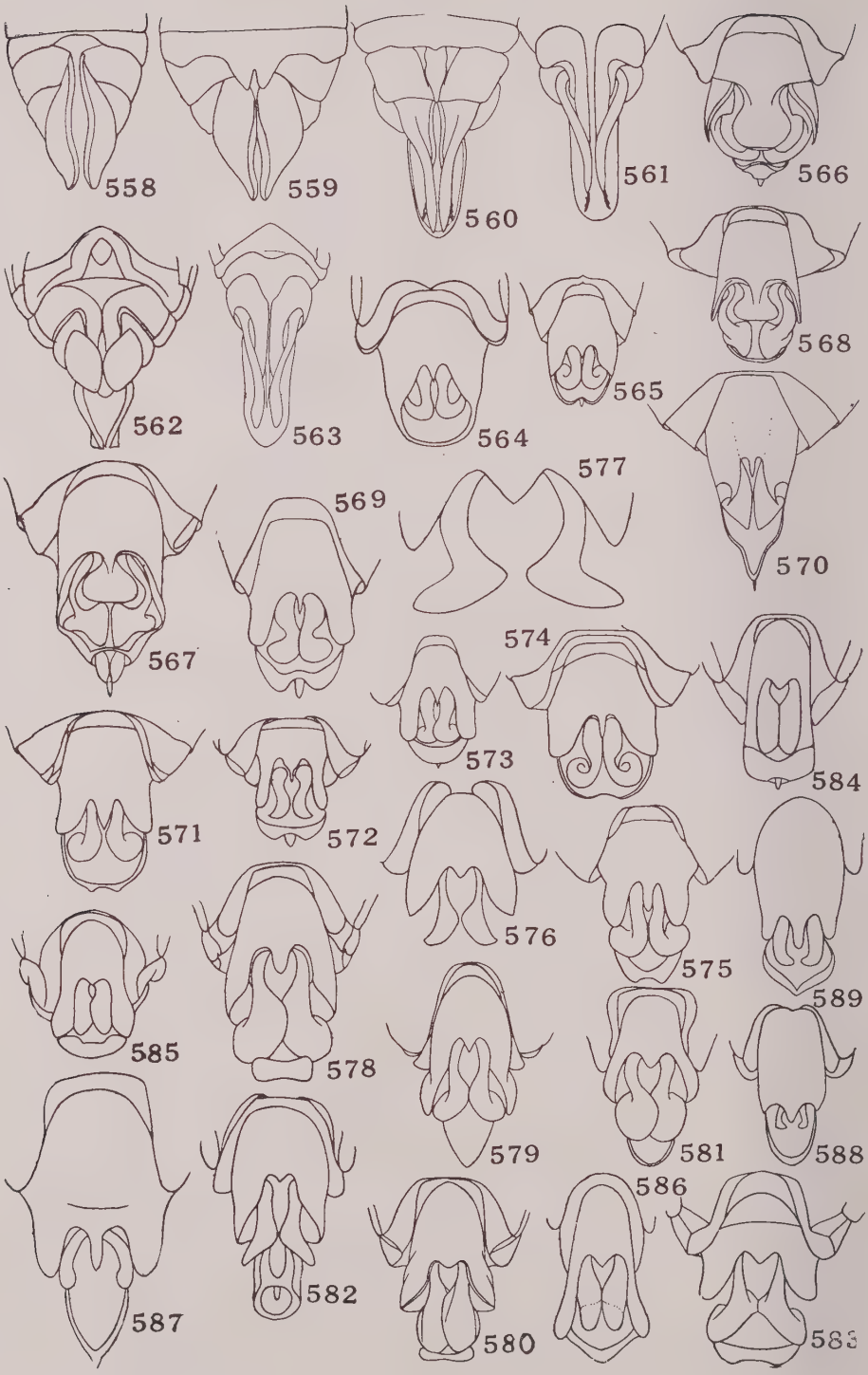
514

Z. P. Metcalf del.

PLATE 65

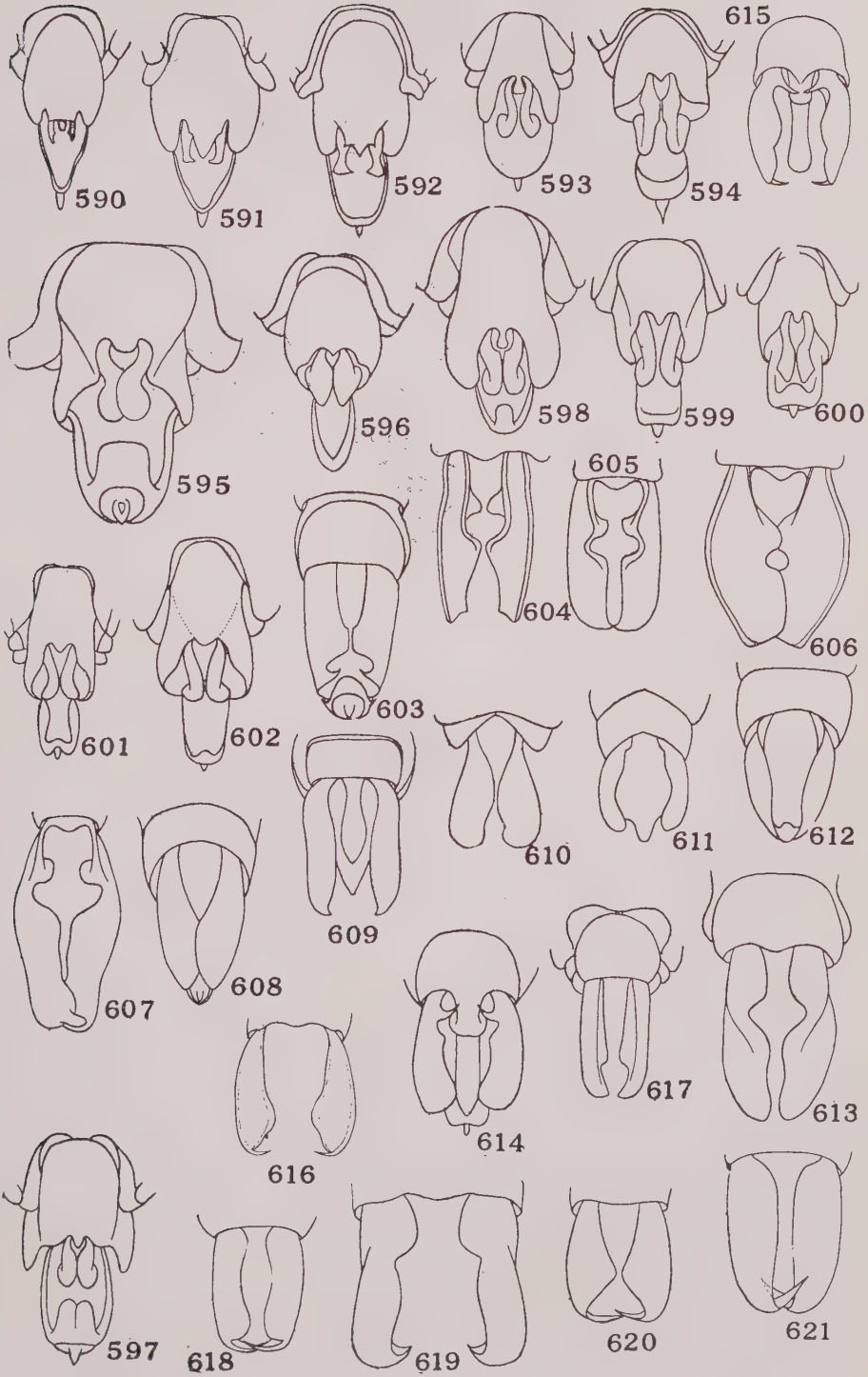


Z. P. Metcalf del.

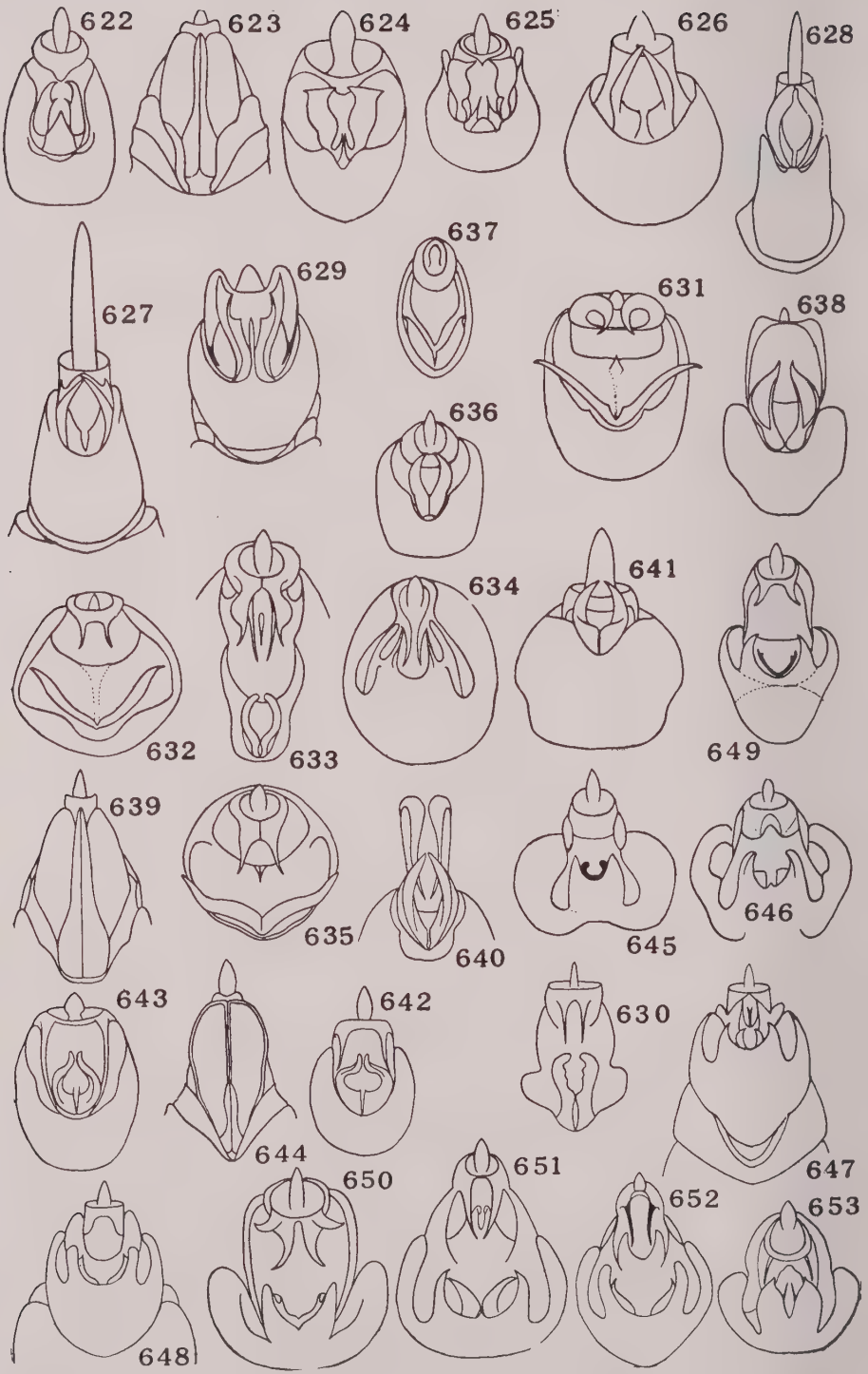


Z. P. Metcalf del.

PLATE 67

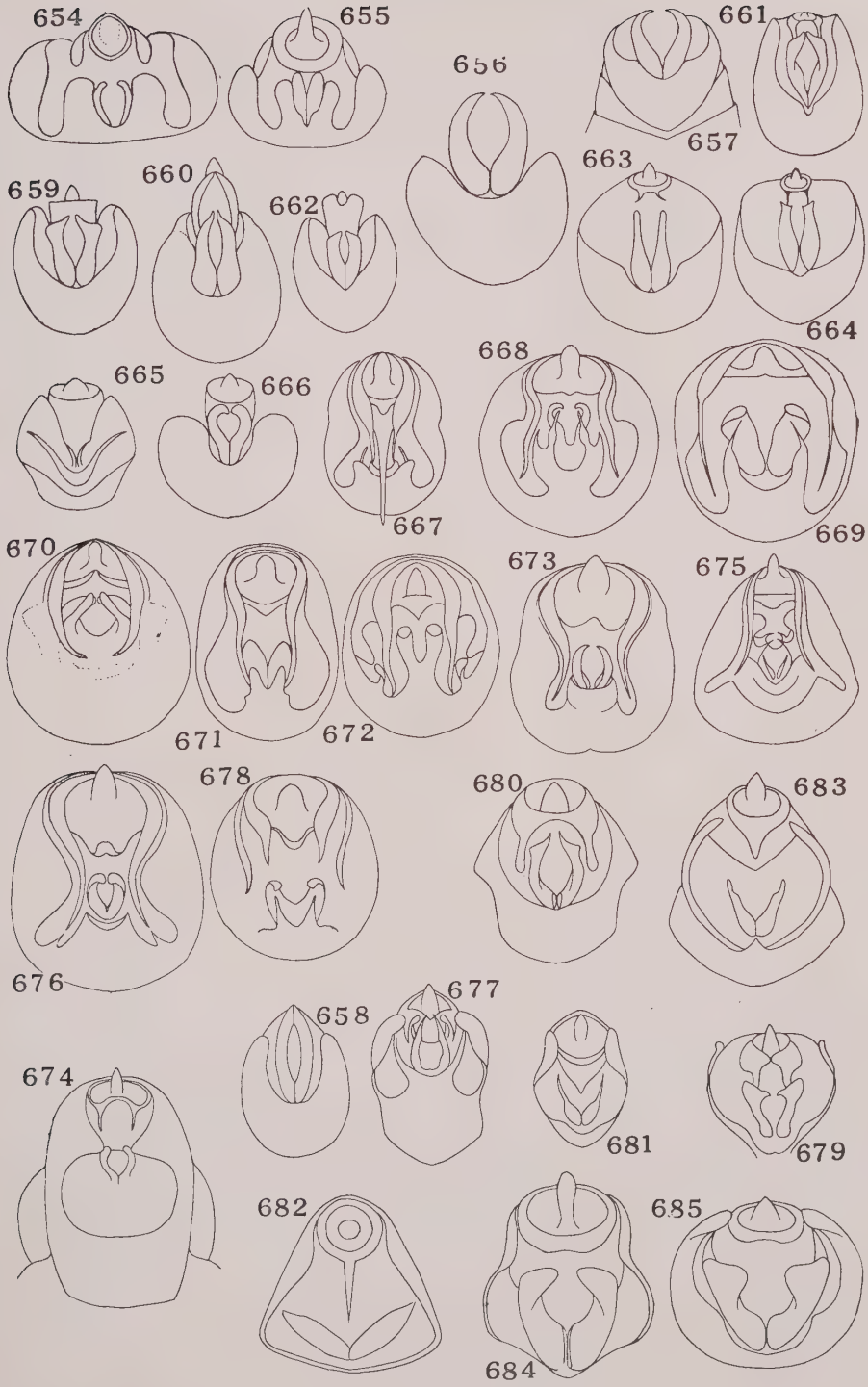


Z. P. Metcalf del.



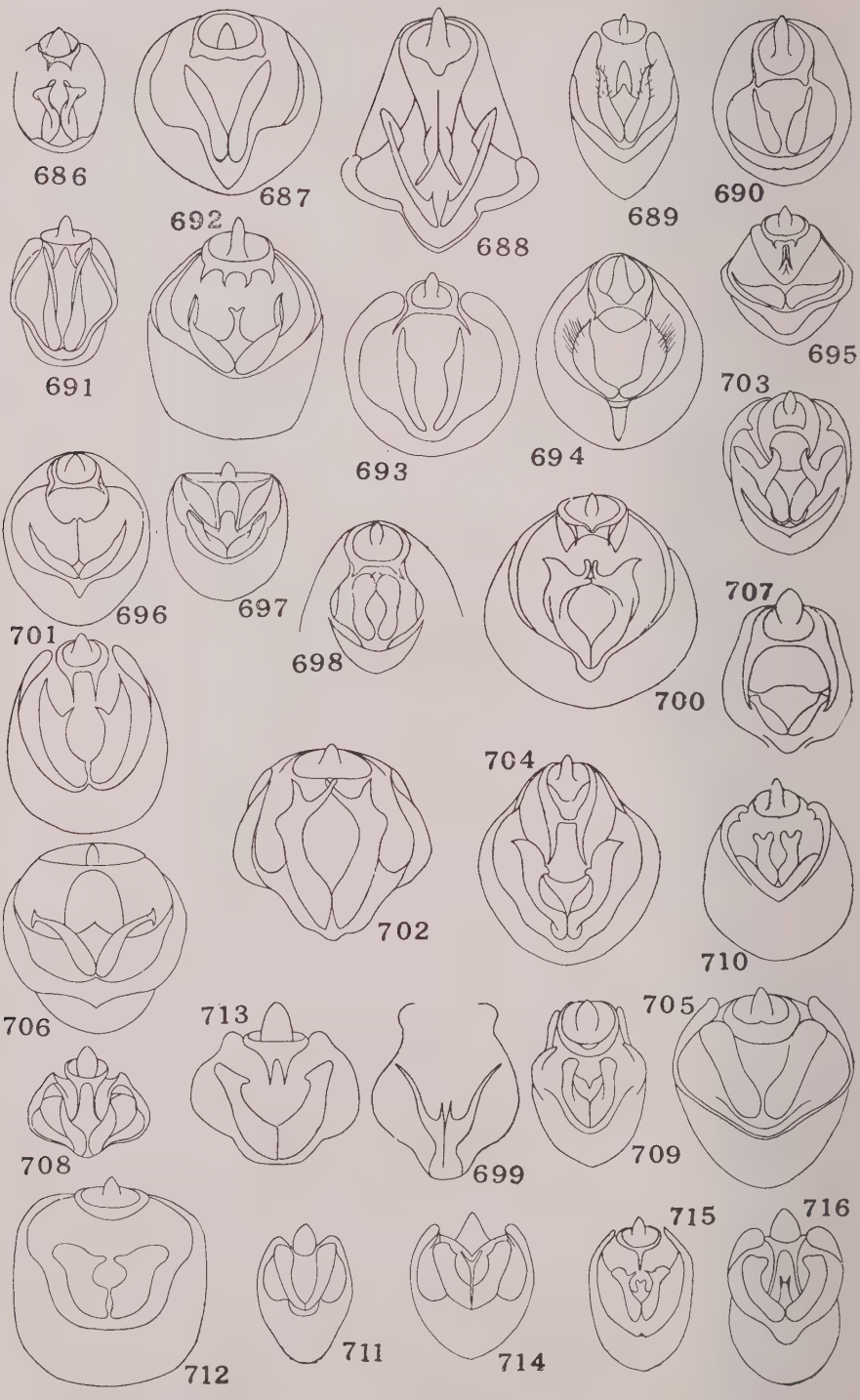
Z. P. Metcalf del.

PLATE 69



Z. P. Metcalf del.

PLATE 79



Z. P. Metcalf del.

THE GASTEROMYCETES OF NORTH CAROLINA

By W. C. Coker and J. N. Couch

The Gasteromycetes include a large and varied order of fungi that are characterized by having the hymenium or spore-bearing surface enclosed within a protective coat or coats (volva or peridium) until the spores are ripe, when they are liberated in a powder or slime by the rupture or decay of the coat.* Included in the order are many well known plants that attract the attention by their interesting characters. Such are the puff-balls, earth stars, bird's-nest fungi and stinkhorns. A number are of subterranean growth and never become exposed; others are found just below the surface but become visible on expanding at maturity, others again are quite superficial and visible in youth. It is highly probable that many subterranean species will be unearthed in this state as soon as a careful search is made for them. The edible truffle which grows underground is not a member of this group, but an Ascomycete. The puff-balls when white inside (before the spores begin to ripen) are among the best of edible fungi.

In preparing this paper we have been assisted by other members of the botanical staff. All written matter and nearly all the photographs are by the senior author, and all microscopical preparations used have been carefully examined and compared by him with the drawings made from them. Most of the drawings (which will appear in the following issue of the Journal) have been made by Mr. Couch and inked in by Miss Alma Holland. Some microscopic work done by Mr. Curtis Vogler, a former instructor in this laboratory, has also been utilized. Mr. H. R. Totten has developed and printed most of the photographs. Mr. H. C. Beardslee has been so kind as to send us material from Asheville, which has enabled us to include two species that we had not found. All photographs are natural size unless otherwise stated.

* In the peculiar genus *Gautieria* there is in most species no peridium at maturity, the chambers of the gleba opening directly on the surface. It is a small tuberous plant growing hidden in humus or earth, and therefore rarely found. It has been reported in this country from New York, California and Idaho and is to be expected in our state. See Zeller and Dodge, Ann. Mo. Bot. Gard. **5**: 113. 1918; Zeller, Mycologia **14**: 196. 1922; Atkinson, Bot. Gaz. **5**: 538. 1912; and Fitzpatrick, l. c., p. 135.

IMPORTANT LITERATURE*

Berkeley. Sur la fructification des genres *Lycoperdon, Phallus,* et de quelques autres genres voisins. Ann. Sci. Nat., 2nd ser., **12**: 160, pl. 2. 1839.

Bigeard. Flora des Champignons **2**: 513, pls. 36, 37, and pl. 38, fig. 1. 1913.

Corda. Icon. Fung. **5**: 22, 70, pls. 4, 6, 7 and pl. 8, fig. 51. 1842.

Fischer in Engler and Prantl. Pflanzenfamilien **1**, pt. 1: 276, figs. 126-182. 1900.

Fitzpatrick. A comparative study of the development of the fruit body in *Phallogaster, Hysterangium,* and *Gautieria.* Ann. Myc. **11**: 119, pls. 4-7. 1913.

Fries, Rob. E. Einige Gasteromyceten aus Bolivia und Argentinien. Arkiv För Botanik **8**, No. 11: 1, pls. 1-4. 1909.

Harkness. Californian Hypogæous Fungi. Proc. Cal. Acad. Sci., 3rd. ser., **1**: 241, pls. 42-45. 1899.

Harvey. Contributions to the Gasteromycetes of Maine. Bull. Torr. Bot. Club **24**: 71. 1897.

Hesse. Mikroscopische Unterscheidungsmerkmale der typischen Lycoperdaceengenera. Jahrb. Wiss. Bot. **10**: 383, pl. 28. 1876.

Hesse. Die Hypogaeen Deutschlands. 1890.

Hollos. Die Gasteromyceten Ungarns. Leipzig, 1904.

Kauffman. Outline of the Gasteromycetes of Michigan. Rept. Mich. Acad. Sci. **10**: 70. 1908.

Lloyd. Myc. Notes Nos. 7-9, figs. 30-56. 1901-2.

Lloyd. The Genera of Gastromycetes, figs. 1-14 and pls. 1-11. Cincinnati, 1902.

Lloyd. The Curtis Collection. Myc. Notes No. 15: 152. 1903.

Lloyd. The Lycoperdaceæ of Australia, etc., pls. 25-39 and figs. 1-49. 1905.

Lloyd. Sur Quelques Rares Gastéromycètes Européen. Myc. Notes No. 22: 261, figs. 98-111 and pls. 28, 35, 72, 87-89. 1906.

Massee. A Monograph of the British Gastromycetes. Ann. Bot. **4**: 1, pls. 1-4. 1889.

Morgan. Gastromycetes. Journ. Cin. Soc. Nat. Hist. **11**: 141, pl. 3. 1889; **12**: 8, pls. 1, 2. 1889; **12**: 163, pl. 16. 1890; **14**: 5, pls. 1, 2. 1891; **14**: 141, pl. 5. 1892.

Rea. British Basidiomycetæ, p. 21. 1922.

Saccardo. Sylloge Fungorum **7**: 1, 469. 1888; **9**: 262. 1891; **11**: 152. 1895; **14**: 254. 1899; **16**: 224. 1902.

Schroeter. In Cohn's Kryptogamen Flora von Schlesien **3**, pt. 1: 689. 1888.

Trelease. Morels and Puff-balls of Madison. Trans. Wisc. Acad. Sci. Arts and Letters **7**: 105, pls. 7-9. 1888.

Tulasne, L. R. and Ch. De la fructification des *Scleroderma,* comparé à celle des *Lycoperdon* et des *Bovista.* Ann. Sci. Nat., 2nd. ser., **17**: 5. 1842.

Tulasne, L. R. and Ch. Champignons hypogés de la famille des Lycoperdacées. Ann. Sci. Nat., 2nd. ser., **19**: 373. 1843.

Tulasne, L. R. and Ch. Fungi nonulli hypogæi, novi vel minus cogniti. Parlatore, Giorn. Bot., **2**: 55. 1844.

* References to other less comprehensive literature will be found under the families, genera and species.

Tulasne, L. R. Fungi Hypogæi. Histoire et monographie des champignons Hypogés. Paris, 1851.
Vittadini. Monographia Tuberacearum. Mediolani, 1831.
Vittadini. Monographia Lycoperdineorum. Mem. Accad., Torino, 5: 145, pls. 1-3. 1843.
Vittadini. Monographia Lycoperdineorum. Ann. Sci. Nat., 2nd. ser., 19: 277. 1843.
Winter. Gasteromycetes. In Rabenhorst's Krypt.-Fl. Deutsch. 1, Abtl. 1: 864. 1884.
Zopf. Die Pilze, p. 362. 1890.

KEY TO THE FAMILIES

Plants emerging at maturity from a soft volva or "egg;" the spores borne in a slimy, brown, bad-smelling liquid at the top of a stalk or net or several columns ..... *Phalloideæ*

Not as above

Plants with a distinct firm or gelatinous stalk which carries the spore-bearing sac, the latter in our representatives having a distinct apical mouth through which the spores escape as a dry powder.

Stalk firm and fibrous; mouth not red..... *Tylostomaceæ*

Stalk gelatinous; mouth red..... *Calostomaceæ*

Plants without a distinct, terete or gelatinous stalk; if a stalk is present it is thick and expands gradually into the swollen spore-bearing part above.

Plants small, shaped like cups or tumblers or subspherical, at maturity opening in most of the species over the entire top by the collapse of a veil (or rarely by the crumbling of the peridium) to expose a number of small peridioles with hard coats which contain the spores, the whole looking like a little nest containing eggs. In one genus of minute plants an outer peridium opens and an inner peridium evaginates itself with a snap and throws out for some distance a single, minute, black peridiole..... *Nidulariaceæ*

Not as above

Peridium without a distinct outer layer that falls away or splits; at maturity opening at the top by irregular lobes, or by an irregular tear, or by crumbling or rotting away. Elongated threads (capillitium) not present among the spores.

Gleba not formed of hollow chambers, but of sterile plates cutting out irregular blocks which are stuffed with the fertile tissue; at maturity crumbling into a dusty powder..... *Sclerodermataceæ*

Gleba formed of hollow chambers (at least when young) which are lined with the hymenium.

Peridium rotting away after maturity, the gleba (at least in species we are treating) turning into a slimy mass..... *Hymenogastraceæ*

Peridium crumbling away after maturity, the glebal chambers remaining intact and falling apart as fine sand-like particles.....Genus *Arachnion*

Peridium with a distinct outer coat which falls away in flakes or wears away by degrees at maturity, or dehisces equatorially, or (in *Geaster* and *Astræus*) splits into star-like rays to expose the thin, pliable or (in *Calvatia*) fragile and brittle inner peridium; gleba (except in *Astreæus* and *Disciseda*) composed of small, hollow chambers lined with the hymenium; spores mixed with a true capillitium of long, slender, branched or unbranched threads, and escaping as dust through a definite (except in *Calvatia*) pore or slit. (In several small species of *Lycoperdon* the outer peridium is very thin, obscure and persistent, and in *Myriostoma* there are several pores) *Lycoperdaceæ*

FAMILY PHALLOIDEÆ

Plants consisting at first of a white, elastic, oval or subspherical "egg," which consists of three coats, the central one soft and gelatinous, which break at maturity to allow the elongation and exposure of the curious, spongy, and in some species brightly colored receptaculum of various shapes which bears above either on itself or on a specialized appendage the slimy, deliquescing gleba which contains the minute, smooth spores, and which in nearly all cases has a very strong and offensive odor by which insects are attracted to scatter the spores.*

The family is divided into two subfamilies or by some authors (as Corda) into two distinct families which are separated by the position of the gleba and by other important microscopical characters. These subfamilies may be simply defined as follows:

Gleba (and spore slime) borne on the inner side of the receptaculum.....*Clathreæ*

Gleba borne on the outer surface of the receptaculum.....*Phalleæ*

In addition to the genera treated by us there has been found of the true phalloids in the United States only *Anthurus borealis* (see Burt, l. c., 1849, and Lloyd, Myc. Notes No. 17: 183. 1904), which is placed in *Lysurus* by Lloyd, and an undetermined species of *Lysurus* from Texas (Lloyd, Phalloids, p. 40; Gerard, l. c., p. 30). The unique genus *Phallogaster*, placed by Morgan, its author (l. c., 15: 171, pl. 11. 1892), and by Thaxter (Bot. Gaz. 18: 117, pl. 19. 1893) in the *Phalloideæ*, but differing from them in the absence of a volva and in

* Drawings of spores in species of this family will appear on a plate to be published in the continuation of this paper.

other ways, and treated by Fischer in the *Hysterangiaceæ* (l. c., Pflanzenfamilien, p. 307), is known only from the United States and Canada (see also Lloyd, Known Phalloids, p. 71, figs. 93 and 94).

As the number of our species of Phalloids is small, we key all of them here under the family, and for the convenience of students we include all described species from the United States.

IMPORTANT LITERATURE

Atkinson. Origin and Taxonomic Value of the Veil in *Dictyophora* and *Ithyphallus*. Bot. Gaz. **51**: 1, pls. 1-7 and one text fig. 1911.

Burt. The Phalloideæ of the U. S. I. Bot. Gaz. 22: 273, pls. 11 and 12. 1896.

Burt. The Phalloideæ of the U. S. II. Bot. Gaz. 22: 379. 1896.

Burt. The Phalloideæ of the U. S. III. Bot. Gaz. **24**: 73. 1897.

Burt. A North American *Anthurus*. Mem. Boston Soc. Nat. Hist. 3, No. 14. 1894.

Corda. l. c., **5**: 70, pl. 6, fig. 49, pl. 7, and pl. 8, fig. 51.

Fischer. Beiträge zur Morphologie und Systematik der Phalloideen. Ann. Myc. **8**: 314, pl. 5. 1910.

Fischer. Unters. z. vergleichenden Entwicklungsgeschichte u. Systematik d. Phalloideen. Denkschriften d. Schweiz. Naturforschenden Gesellschaft **36**: 2. 1900.

Gerard. Additions to the U. S. Phalloidei. Bull. Torr. Bot. Club. **7**: 29. 1880.

Gerard. Correlation between the Odor of Phalloids and their Relative Frequency. As above, p. 30.

Lloyd. The Phalloids of Australasia, figs. 1-25. Cincinnati, 1907.

Lloyd. Concerning the Phalloids. Myc. Notes No. 24: 293, figs. 131-135 and pls. 91-93. 1906; No. 26: 325, figs. 160-163 and pls. 112-121. 1907; Nos. 28-30: 349, figs. 167-223. 1907-08.

Lloyd. The Phalloids of Japan. Myc. Notes No. 31: 400, figs. 236-242. 1908.

Lloyd. Synopsis of the Known Phalloids, figs. 1-107. Cincinnati, 1909.

Long. The Phalloids of Texas. Journ. Myc. **13**: 102, pls. 102-106. 1907.

Schroeter. In Cohn's Krypt.-Fl. Schlesien 3, pt. 1: 687. 1889.

For other literature see p. 94 and Fischer as cited there.

KEY TO THE PHALLOIDS OF THE UNITED STATES*

CLATHREÆ

Receptaculum composed of a stout, netted globe.....Clathrus cancellatus

Receptaculum composed of two to five stout columns fused only above
Clathrus columnatus

Receptaculum composed of a single distinct stalk bearing a subglobose, netted, spore-bearing part on the end; red above.....*Simblum sphærocephalum*

Receptaculum as above, but color yellow all over.....Simblum texense

Receptaculum stalked as in *Simblum*, but the apical spore-bearing part composed of several (usually six) short, hollow arms, incurved and meeting above at

* North Carolina species are given in italics.

first and enclosing the gleba; stalk white.....Anthurus borealis
As above, but gleba borne on outer surfaces of the arms.....Lysurus sp.

PHALLEÆ

Gleba (and spore slime) borne on the upper part of the stalk itself
Stalk 10-17 cm. long, tapering gradually from the center upward to a rounded point; spores 4-7μ long.....*Mutinus Curtisii*
Stalk 6-8 cm. long, nearly cylindrical except for the tapering base (at times), the tip rather abruptly rounded and the spore-bearing part more or less sharply delimited from the sterile part; spores 3.7-4.8μ long.
Mutinus Ravenelii
(and M. caninus, if that is different)
Gleba borne on a pendent cap hanging from the stem tip
An obvious netted veil absent
Stalk watery white.....*Ithyphallus Ravenelii*
Stalk reddish.....*Ithyphallus rubicundus*
(reported from N. C. by Curtis)
An obvious netted veil-like indusium pendent from the stem apex and exposed for some distance below the cap.....*Dictyophora duplicata*

ANOMALOUS

Volva absent; plant until mature looking like a long-stemmed puff-ball, but opening by holes and flaps to expose the green, slimy masses of gleba inside
Phallogaster saccatus

CLATHRUS

Receptaculum without a single distinct stem, but composed of an inflated hollow network or of several curved columns meeting and fused above; in all cases having the spore-bearing gleba attached to the inner side above as a slimy mass. Odor offensive. Only a few species are known and but two have been found in the United States.

For literature see under the family.

Clathrus columnatus Bosc

Laternea columnata Nees

PLATE 71

Eggs subspherical, about 2.5 cm. thick, bursting above into several flaps to allow the expansion of the receptacle which consists of 2-5 (in our plants 4-5) stout, spongy, curved and very delicate columns with separate, pointed, basal ends which remain in the volva, the distal ends incurved and completely fused into a flat roof from which hangs within the dark slimy mass of the spore-bearing gleba. Color of the

MUTINUS RAVENELII. No. 741 [left].
CLATHRUS COLUMNATUS. No. 4949 [right].

receptacle rosy red, the base pale to colorless; volva watery white, attached at base by a cord-like root. Odor about that of a stink horn, strong and fetid.

Spores (of No. 4949) smooth, elliptic, minute, 1.8-2.4 x 3.7-4.8μ.

This plant seems to be entirely southern in its range (but see Saccardo's Sylloge 7, part 1, p. 10) and our collections have come from the subtropical southeast corner of our state, where *Sabal Palmetto* grows, and from coastal South Carolina. It is said to be common in Florida, and Curtis reports it as occurring in the lower and middle districts of North Carolina in sandy woods. It was originally described from South Carolina and is also known from the Gulf States. An interesting anomaly is shown by one of our plants (pl. 71). There is a natural perforation on one side at the top just about the center of one of the columns, exactly like the more numerous perforations in *C. cancellatus* and in *Simblum*. For development and microscopic detail see Burt, Bot. Gaz. 22: 273, pls. 21 and 22. 1896. The beautiful species, *C. cancellatus*, has been found a few times in the United States and should be looked for. It has been reported from Georgia (Schweinitz, Syn. Fung. Car. No. 557, as *C. ruber*) and from Florida (Lloyd, Myc. Notes No. 24: 296).

Illustrations: Bosc. Mag. der Gesell. naturforschender Freunde Berlin 5: pl. 5, fig. 5. 1811.
Burt. As above.
Fischer. Pflanzenfamilien 1, pt. 1: fig. 120 B.
Lloyd. Myc. Works, pl. 92.
Lloyd. Myc. Notes No. 26: fig. 162.
Lloyd. Phalloids of Australia, fig. 20.

Smith's Island. Couch and Grant, No. 4949. In a sandy road, December 29, 1921.
Georgetown, South Carolina. Coker, No. 6013. In sandy soil near Silver Hill Farm, December 29, 1922.

SIMBLUM

Receptaculum formed of a distinct, hollow, delicate stalk which is transformed above into a somewhat larger inflated network which bears the gleba slime on the inside. Volva watery white; receptaculum bright colored, red (in our species) or yellow, rarely whitish; odor offensive.

Only a few species are known and only two are North American. For literature see under the family.

Simblum sphærocephalum Schlecht

Simblum rubescens Gerard

PLATES 72 AND 73

Stalk long, club-shaped, hollow, spongy, tapering downward to a narrow attachment in the bottom of the large, white, toughish, inflated volva; terminated above by the subglobose structure of thick, anastomosing strands that holds the dark slime containing the spores. Color bright red above, fading to pale below; odor strong and repulsive. The entire plant is about 7-9 cm. high and the stalk about 1-1.6 cm. thick above, its honeycombed wall 3-4 mm. thick near the top and only 1 mm. thick below.

Spores (of No. 1427) elliptic, smooth, 1.4-2 x 3.7-4.4μ.

This is a rare plant in the United States and has not been reported before from North Carolina (for distribution see Lloyd's Myc. Notes No. 19: 220. 1905). It is said to be common in South America. The only other North American species is *S. texense* which differs from the present one in its yellow color and longer spores, which are 3 x 7μ (see Long, l. c., p. 112, pl. 106, fig. 11).

Our plate 73 shows an abnormal variation of two plants springing from one volva and fused at their tips. This is apparently of not rare occurrence as a similar example is shown in Lloyd's Myc. Notes No. 24, fig. 133, from a photograph of a Brazilian plant by Rick, and another such is illustrated by Gerard in his plate 2 (as cited below).

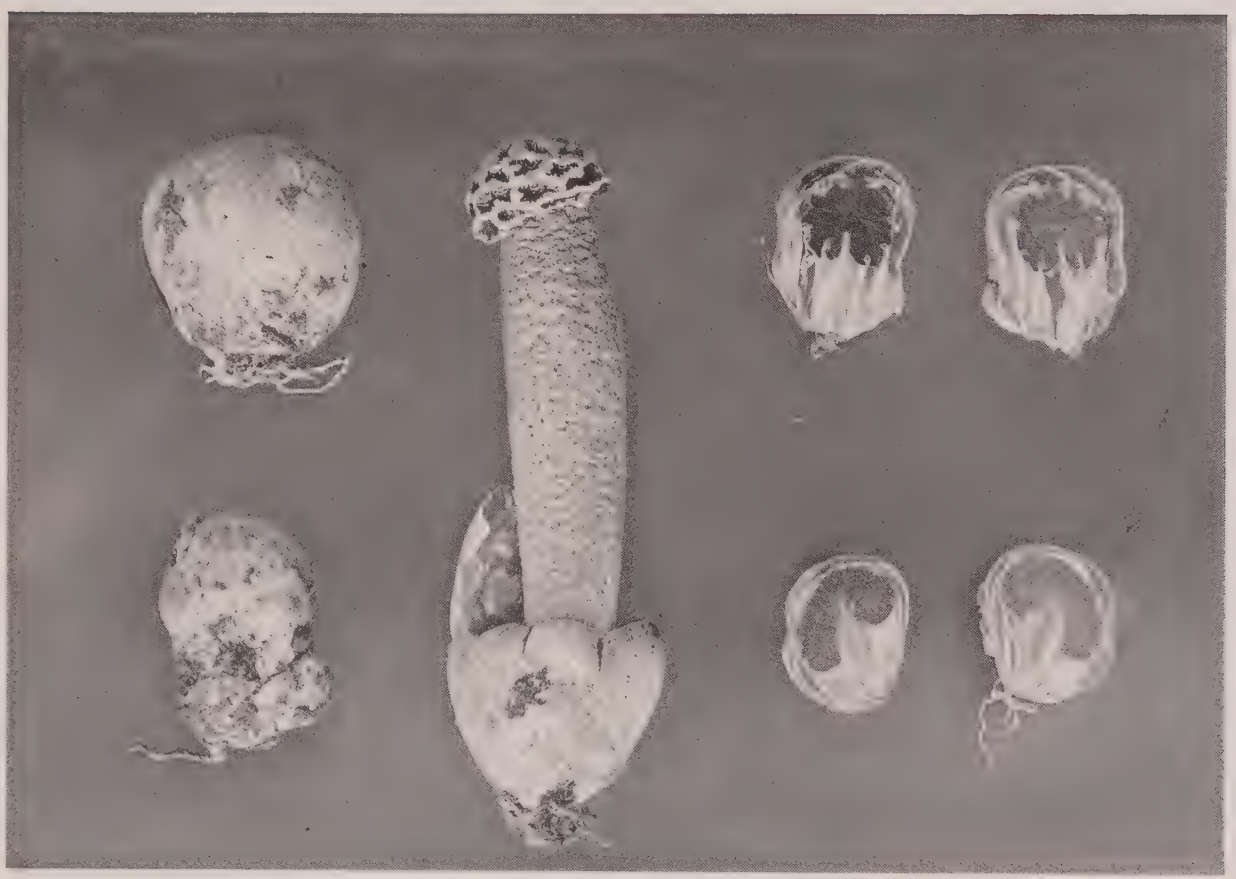
Illustrations: Gerard. Bull. Torr. Bot. Club 7: 8, pls. 1 and 2. 1880.
Long. l. c., pl. 106, fig. 10.

1426. In apple orchard, October 26, 1914.
1427. In grass on campus, fall of 1902. A large number of plants.
5910. On ground in pasture, November 20, 1922.
5917. On ground in pasture by branch, November 22, 1922. Several plants.

MUTINUS

Receptaculum formed of a distinct, delicate, hollow stalk as in *Simblum*, but differing in the spore slime being borne on the outside of the upper part of the stalk itself, which is smooth and more or less pointed, the tip often perforated. Color rosy red above (under and below the deep olive slime), fading downward. Volva soon collapsing against the base of the stalk.

For literature see under the family and species.



SIMBLUM SPHAEROCEPHALUM. No. 5917.

PLATE 73

SIMBLUM SPHAEROCEPHALUM. No. 1426.

Mutinus Ravenelii (B. & C.) E. Fischer

PLATES 71 AND 74

Plants about 6-8 cm. high, the ample volva 2.5-3.5 cm. long; stalk up to 1.3 cm. thick in center and typically tapering a little downward, again nearly cylindrical, the spore-bearing part about 2-2.5 cm. of the apex, more or less abruptly marked off from the sterile part by the narrower, radially elongated, definitely one-layered compartments of the wall. Color bright rosy red above (under and below the slime), fading downwards; apex with or without a small opening; odor strong and offensive. Wall of the stalk about 3 mm. thick in center and 1.5 mm. thick near base; that of the spore-bearing part about 2 mm. thick below and 1 mm. thick above; walls of the stalk compartments 55-75μ thick, with 3-4 layers of cells, those of the spore-bearing part 90-95μ thick, with about 5-7 layers of cells.

Spores (of No. 741) smooth, ellipitic, 1.6-2.2 x 3.7-4.8μ.

This is more common with us than *M. Curtisii*. For treatment of its development see Burt in Ann. Bot. 10: 343, pls. 17, 18. 1896; see also Bambeke, Mém. Acad. Roy. Belgique, 2nd. ser., 2: 1. 1910. Lloyd considers *M. Ravenelii* as different from *M. caninus*, both occurring in the eastern United States (Myc. Notes No. 24: 300; No. 26: 325; Syn. Known Phal., p. 28). Burt considers the two species the same (l. c., p. 344). Lloyd would probably consider the left hand plant on our pl. 74 as *M. caninus*, the two right hand plants as *M. Ravenelii*. We cannot find any important difference in structure among the forms we have collected. *Mutinus caninus* is common in Europe.

Illustrations: Lloyd. Myc. Notes No. 24, fig. 135; No. 28, fig. 183.
Marshall. Mushroom Book, pl. opposite p. 136 (as *M. caninus*).
For illustrations of the European *M. caninus* see:
Fischer. l. c., fig. 142 A-E.
Hollos. l. c., pl. 1, figs. 3-11.
Long. l. c., pl. 104, fig. 9.
Sowerby. Engl. Fungi, pl. 330.

22a. By stone wall near Battle's Park, October 24, 1902. Spores 1.4-2 x 3.7-4.4μ.
24a. Old Chapel Hill collection without label. Spores smooth, 1.6-2.2 x 3.7-4.8μ.
741. On ground near stream, September 12, 1913.
1312. Near brook just above Meeting of the Waters, September 17, 1913. Spores 1.2-2.2 x 3.7-4.6μ.
1729. In low place by branch, September 10, 1915.
1925. In grass in front of Davie Hall, October 25, 1915. Spores 1.6-2.2 x 3.7-4.8μ.

Mutinus Curtisii (Berk.) E. Fischer
M. bovinus Morgan
M. elegans Mont.

PLATES 75 AND 76

Plant about 10-17 cm. high, the white volva at first spherical then elongating and on rupturing at the apex collapsing against the stalk which is almost cylindrical for the first third and up to 2.5 cm. thick, then tapers gradually upward to the blunt point; spore-bearing (slimy) part composing about 3-5 cm. of the apical end, similar in superficial appearance to the rest of the stem except for the slime; color bright rosy red under and below the slime, gradually fading to watery white or flesh color below; apex perforated by a small opening; volva rooted by a strong cord; odor of the brownish slime very strong and offensive.

Spores (of No. 5113) smooth, elliptic, 2-3 x 4-7μ. Wall of the very hollow stem about 2-3 mm. thick and composed of one or two layers of small thin-walled chambers which are irregularly isodiametrical below and change gradually to radially elongated and definitely to a single layer in the slime-bearing part. Walls of the chambers of the stalk 90-95μ thick, with only 3-4 layers of cells; of the spore-bearing part 55-75μ thick with 3-4 layers of cells.

The plants usually appear singly in woods or groves.

Illustrations: Hard. Mushrooms, pl. 56 and fig. 453.
James. Bull. Torr. Bot. Club 15: pl. 86. 1888.
Lloyd. Syn. Known Phalloids, fig. 24 (as *M. elegans*).
Lloyd. Myc. Notes No. 28: fig. 182 (as *M. elegans*).
Morgan. l. c., 11: pl. 3 (as *M. bovinus*). 1889.

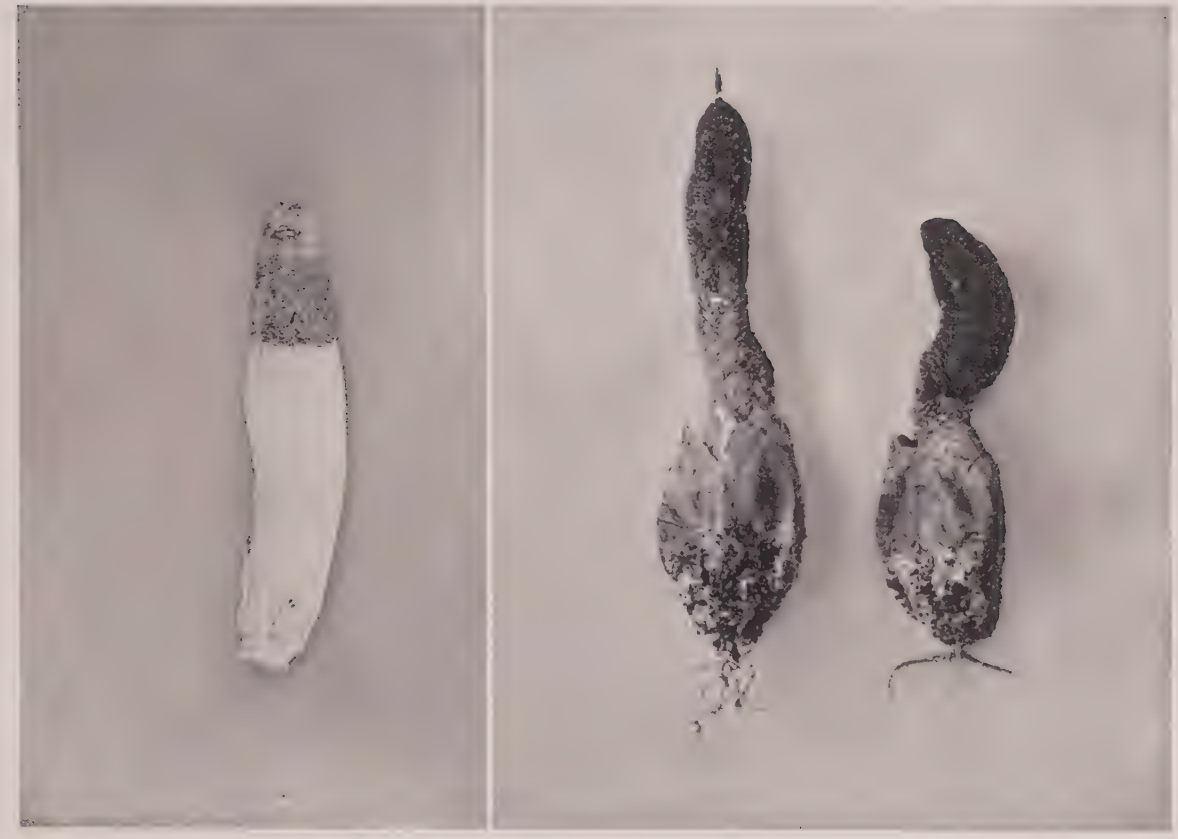
2421. In woods mold, Battle's Park, July 24, 1916. Spores smooth, elliptic, 2-2.8 x 4-7μ.
5113. In rotting leaves, May 16, 1922.

Asheville. Beardslee.

ITHYPHALLUS

Volva and stalk as in *Mutinus*, but the spore slime is borne on the outside of a thin, pendent, campanulate membrane or cap which is free from the stem except at the tip. Between this cap and the stalk above and between the volva and the stalk below another delicate, white membrane or veil is obvious (at least in *I. Ravenelii*).

PLATE 74



MUTINUS RAVENELII. No. 22a [left]; No. 1925 [right].

PLATE 75

MUTINUS CURTISII. No. 2421.

PLATE 76

MUTINUS CURTISII. No. 5113.

We are following Fischer and Atkinson in placing in this genus *Phallus Ravenelii* B. & C., a species closely related to the European *I. impudicus* but separated from it by the smooth surface of the cap. In addition to the former only one other American species is known, *I. rubicundus* (Bosc) E. Fischer, and it has been reported from this state by Curtis. It should be looked for in the coastal plain and can readily be recognized by the red stalk, the other species being white stalked.

For literature see under the family.

Ithyphallus Ravenelii (B. & C.) E. Fischer

Dictyophora Ravenelii (B. & C.) Burt

PLATES 77-79

Stalks usually 10-16 cm. high, tapering gradually upward or nearly equal, about 1.7-2.5 cm. thick, springing from an ovate egg or volva, which is pinkish, tough, thick, wrinkled below and connected with the earth and with other eggs by purplish pink strands or roots which grow out from the base. The eggs are large and just before rupturing may reach a height of 5 cm. and a thickness of 3.5 cm. The cap or pileus is conical and is attached around the raised white ring which terminates the stem. The upper part of the membranous veil is concealed beneath the cap while the lower half remains in the volva around the base of the stem. At times parts or rings of the veil may be torn loose in expanding and cling to the stalk so as to be visible beneath the cap. Surface of the cap minutely granular, not veined or honeycombed, covered at first by the dark, bad-smelling slime of the diliquescent gleba.

Spores (of No. 41a) smooth, elliptic, 1.2-1.8 x 3.7-4.4μ.

This interesting species is generally found growing in soil containing rotten wood such as old wood piles and rotting trash piles and often appears in large numbers from one colony.

Illustrations: Atkinson. l. c. pl. 2; pl. 3, fig. 7; pl. 4, fig. 10; pl. 6, fig. 14.
Hard. Mushrooms, figs. 447-449.
Lloyd. Syn. Known Phalloids, figs. 7 and 8.
Lloyd. Myc. Notes No. 28: fig. 168.
Peck. Bull. Torr. Bot. Club. 9: pl. 25. 1882.
Scofield. Minn. Bot. Survey 2: pls. 29-31. 1900.

41a. Chapel Hill. No other data.
618. In pile of chips and trash in road, October 24, 1912.
649. Same spot as No. 618, October 31, 1912.

Asheville. Beardslee.

DICTYOPHORA

With the characters of *Ithyphallus* except that there is a large campanulate, veil-like, netted indusium that is attached to the stem tip under the cap and extends far below it. Atkinson has shown (l. c.) that this indusium is a distinct organ and not homologous with the short, membranous veil of *Ithyphallus*. The species here included is the only one known in the United States.

For literature see under the family.

Dictyophora duplicata (Bosc) E. Fischer

PLATES 80-83

Our largest and most massive phalloid, arising from a large egg which is subspherical, ovate or sometimes flattened, about 4-4.5 x 4.5-5 cm., when flattened up to 7 cm. broad and 5 cm. high, white and plicate below as in a peeled orange, the upper half smooth, pale flesh color to deep fleshy brown; in the center below is given off a large, fleshy root, and sometimes one or two smaller, more lateral ones. The expanded plant may reach a height of 17 cm. with the fertile, pendent, apical cap about 5 cm. long and broad, its outer surface strongly chambered by anastomosing plates, over which the brownish olive slime is spread. Between the cap and the stem, and hanging from the top, is a beautiful net-like veil (technically the indusium) of a light rosy pink color that extends below the cap for about 3-5 cm., the perforations being rather regular and about 1-2 mm. broad except towards the margin where they become much smaller. Stalk about 4.5 cm. thick, nearly cylindrical, very hollow and with chambered walls; between its base and the volva is a thick, brownish yellow slime which is separated from the stem by a thin membrane. The odor of the dark spore slime above is offensive but not nearly so much so as in the species of *Mutinus*, being weaker and not so distressingly fetid.

Spores (of No. 5195) smooth, elliptic, 1.2-1.8 x 3.7-4.4μ.

Not rare in Chapel Hill, occurring usually in a scattered colony of several in woods mold in deciduous woods. *Dictyophora phalloides* (*Phallus indusiatus*) is a closely related tropical species.

Illustrations: Atkinson. l. c., figs. 6, 7, 11, 13, 16.
Hard. Mushrooms, pl. 55.
Lloyd. Syn. Known Phalloids, fig. 16.
Murrill. Chart of Edible and Poisonous Mushrooms, fig. 34.
Rau. Bot. Gaz. **8**: pl. 4 (as *Phallus togatus*).

836a. On lawn of president's house, October 22, 1911.
2286. On a ditch in woods, June 28, 1916.
5195. In rich woods, June 20, 1922.
5343. In deciduous woods near Forest Theater, July 8, 1922. Plant 12 cm. long.

Asheville. Beardslee.

ITHYPHALLUS RAVENELII. No. 649.

ITHYPHALLUS RAVENELII. No. 649.

ITHYPHALLUS RAVENELII. No. 618.
Reduced. Largest plant 7¾ in. long.

DICTYOPHORA DUPLICATA. No. 2286.
Much reduced (actual length 18.5 cm.).

PLATE 81

DICTYOPHORA DUPLICATA. No. 5343.

DICTYOPHORA DUPLICATA. No. 5374.

PLATE 83

DICTYOPHORA DUPLICATA, "EGG." No. 2286.